A+

THE INDEPENDENT GUIDE FOR **apple** COMPUTING

VOLUME 2 ISSUE 5 MAY 1984 $2.95

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- ACCELERATING YOUR APPLE II
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- GOLDEN'S APPLES
- THE MAC ACCORDING TO HOGAN
- REVIEWS:
  - VIZ-A-CON & VIZ-A-MERGE
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ONE SIMPLE SOLUTION

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PDQ II comes with a full one year warranty and will be available through your local Apple dealer If you simply cannot wait, send your check or M.O. for $1290 (postage included) to: Enhancement Technology Corporation, P.O. Box 1267, Pittsfield, MA 01202. Mass residents must include 5% sales tax.

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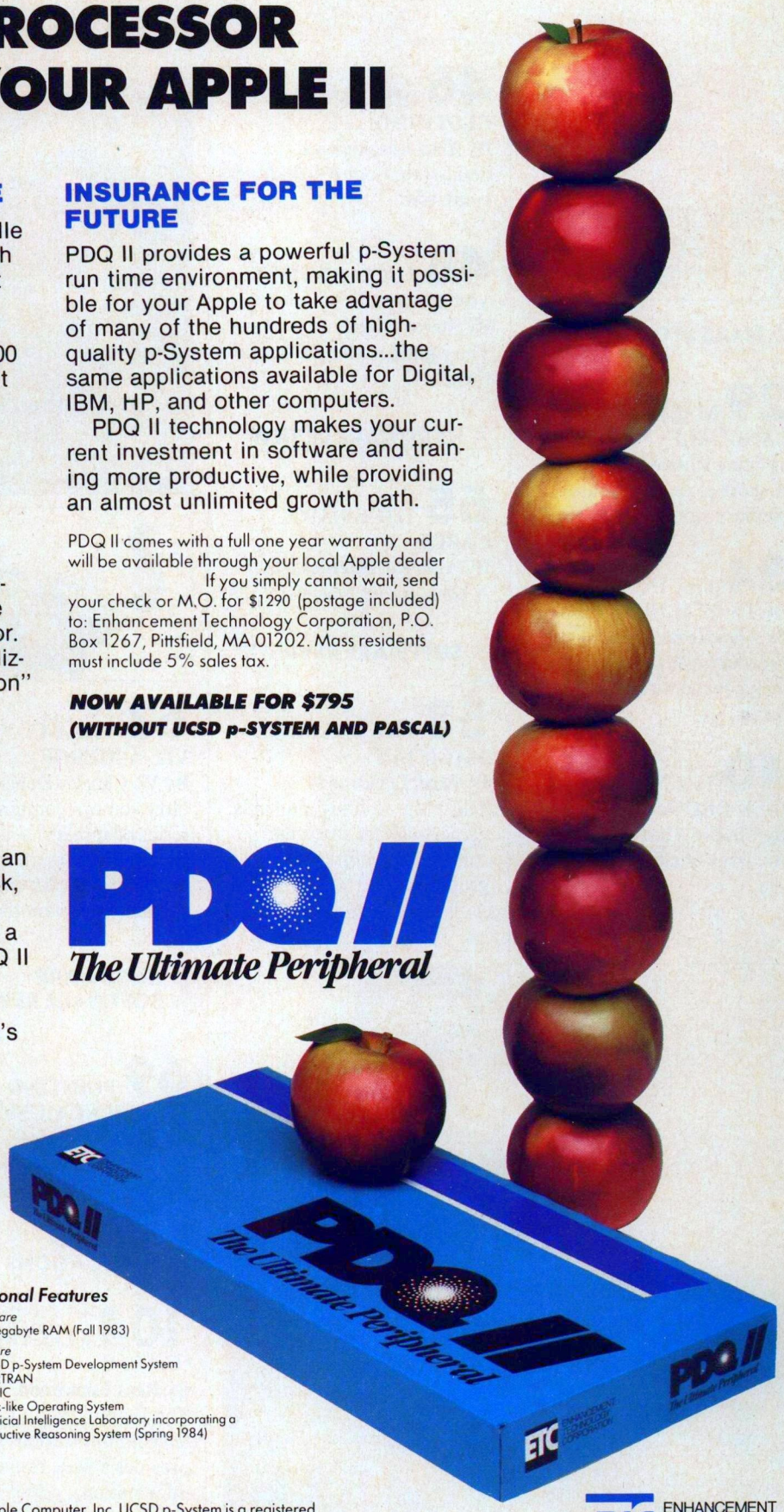
The Ultimate Peripheral



PDQ II SYSTEM SPECIFICATIONS

Standard Features

Microprocessor
- 16/32 bit MC68000
- 10 MHZ

User Memory
- 256K Bytes RAM

Integrated Functionality
- Multiple printer/communications buffering
- Pseudo-disk operations
- Track buffering (p-System)

ETC Software
- ETC MC68000 Assembler
- ETC MC68000 System Monitor
- ETC p-System (version IV) to Apple DOS Interface Utility

Languages and Software Systems Supported
- Applesoft BASIC Compatibility & Speed up
- Apple DOS 3.3
- UCSD p-System (version IV) Interpreter—executes UCSD Pascal, FORTRAN-77 and BASIC P-Code
- UCSD Pascal ***(Now Included!)***

Optional Features

Hardware
- 1 Megabyte RAM (Fall 1983)

Software
- UCSD p-System Development System
- FORTRAN
- BASIC
- Unix-like Operating System
- Artificial Intelligence Laboratory incorporating a Deductive Reasoning System (Spring 1984)

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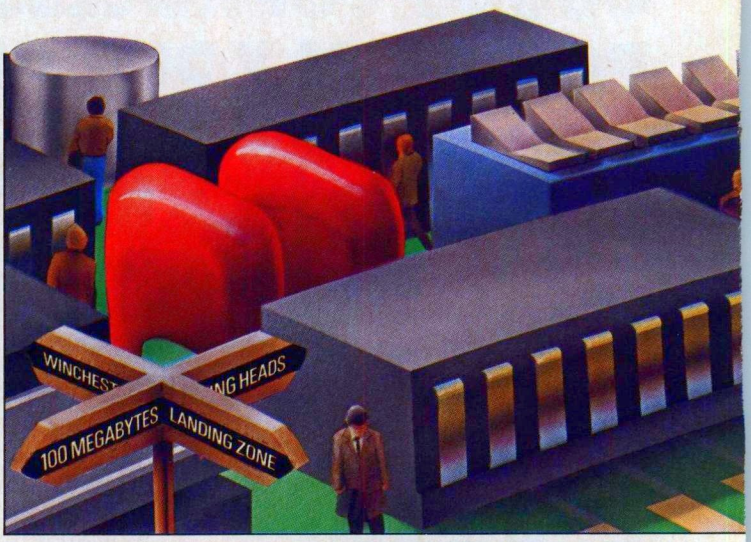

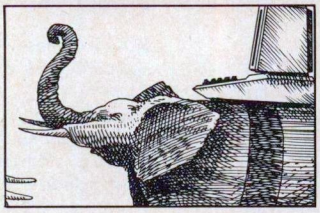

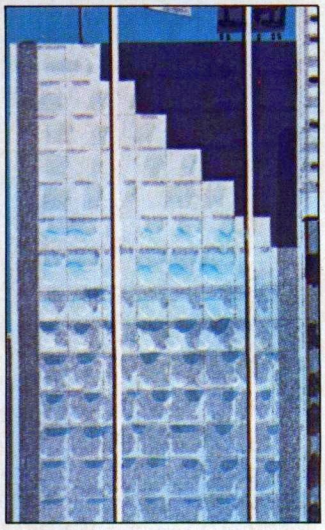

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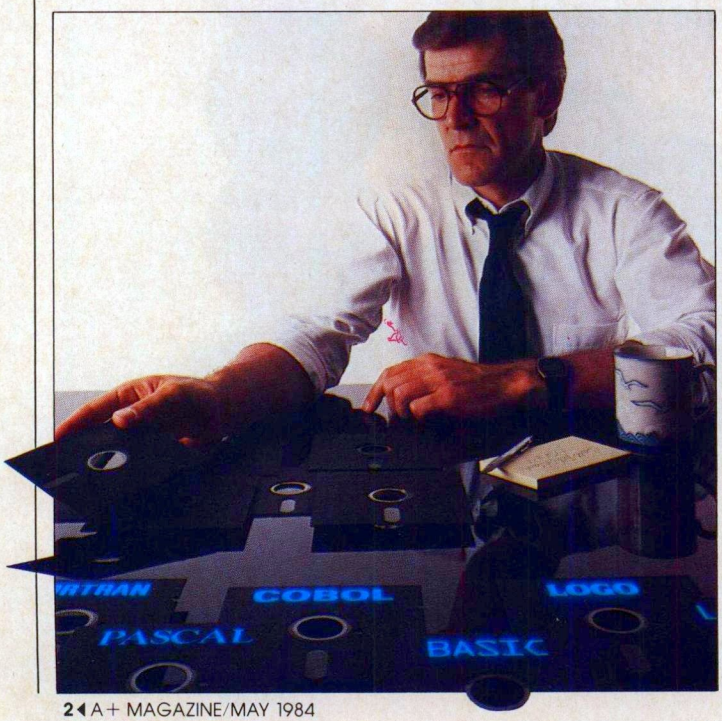

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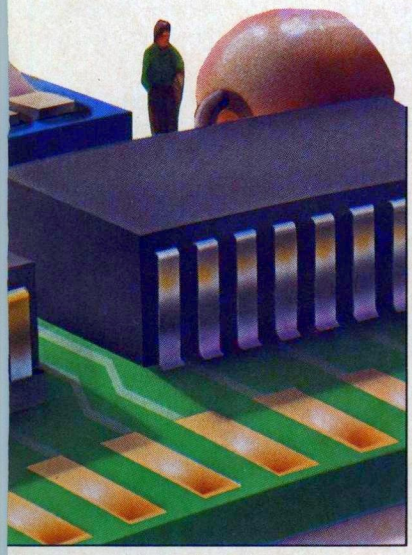

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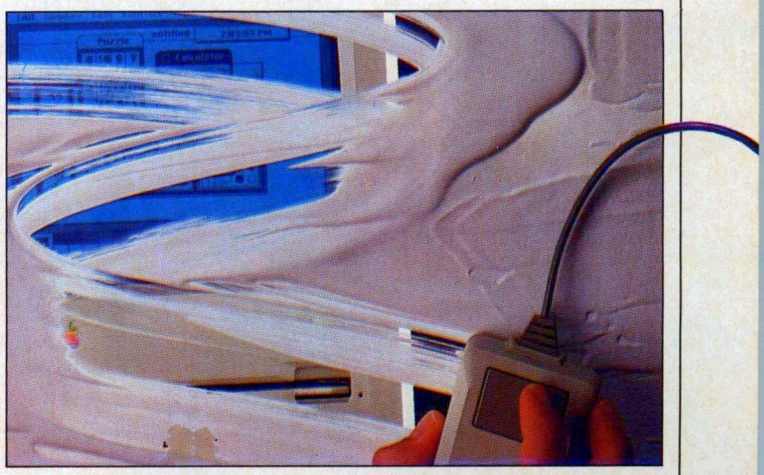

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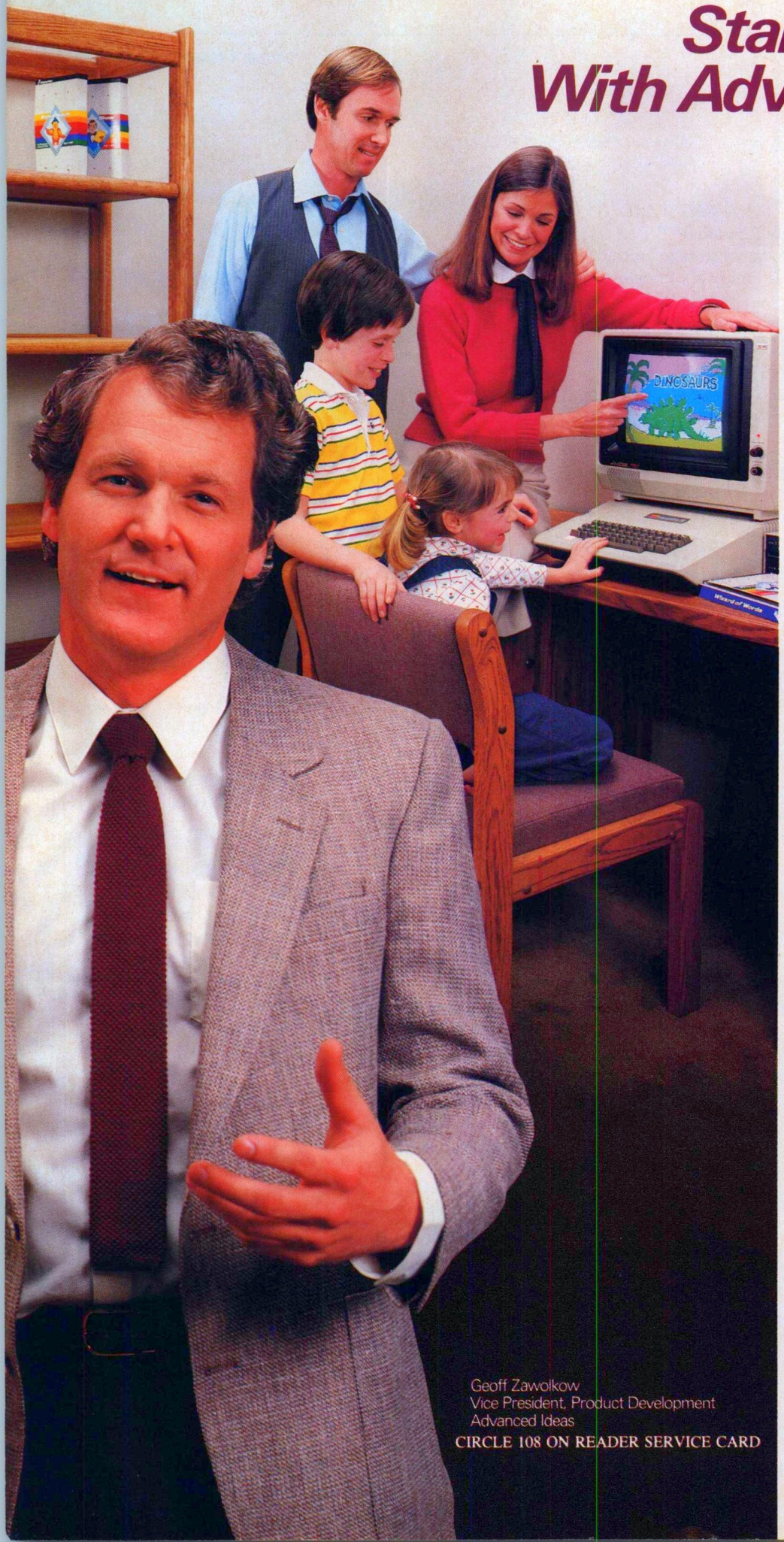
Start A Tradition With Advanced Ideas™



Bring the whole family together with programs that are educational, flexible, extendable and *fun.* As the years go by you'll be glad you did.

Families like yours know programs aren't all the same. And that a computer is only as good as the software that runs on it.

So go ahead. Demand programs flexible enough to fit your children's abilities as they grow. Insist on features that extend subject matter as far as you want to take it. And be unimpresed if the whole thing isn't great fun. Then watch as your family keeps coming back to Advanced Ideas. You'll discover that you've really started something.

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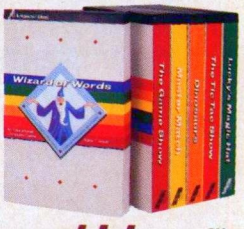

Geoff Zawolkow
Vice President, Product Development
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Don't buy a spreadsheet

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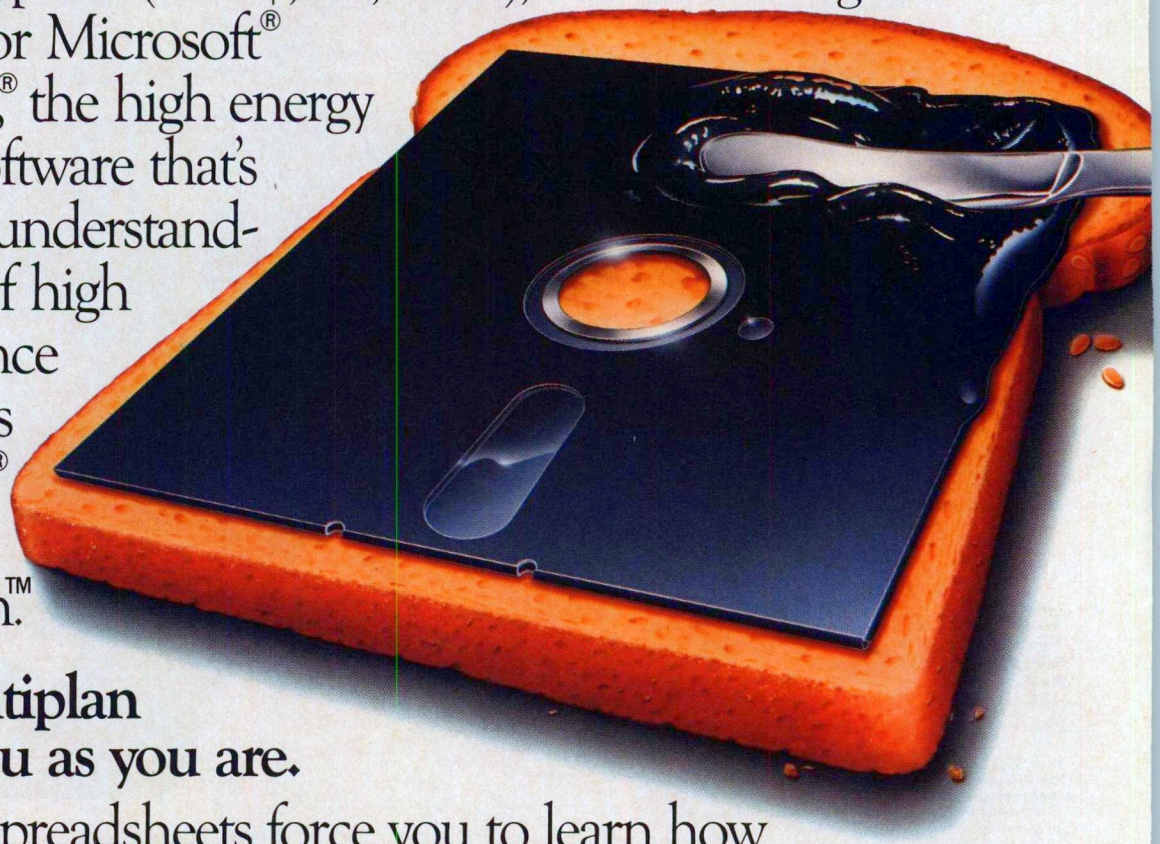

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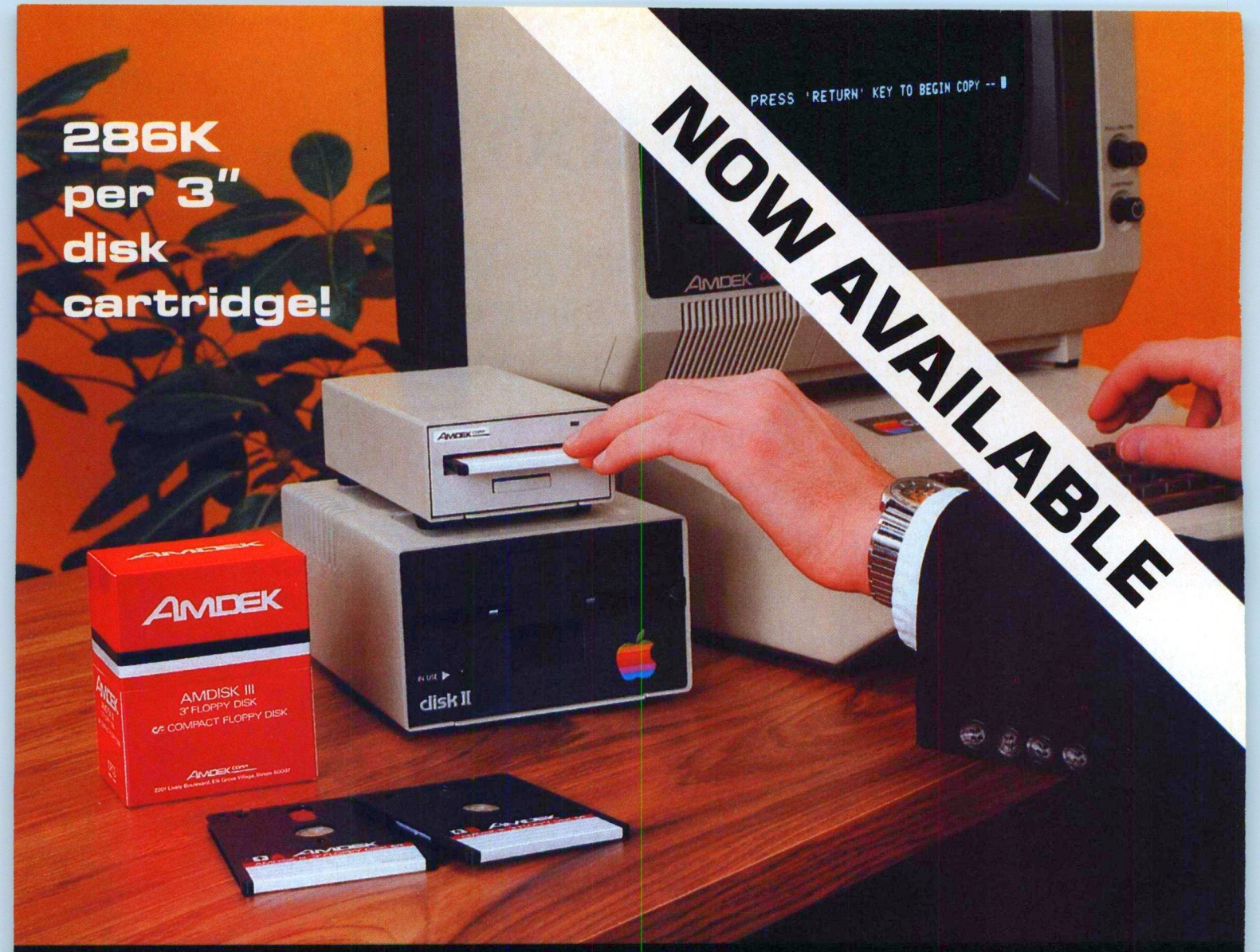

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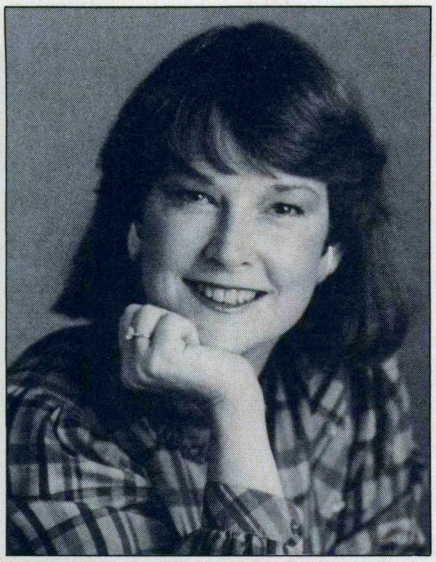
A MESSAGE FROM MAGGIE



Macintosh—the name used to be a British word for a raincoat, but since January 24, the word Macintosh also means a cream-colored personal computer. After a lavish introduction of their new product, the makers of your first personal computer want to be the makers of your second one.

The Macintosh is quickly capturing the hearts and imaginations of many people. Crowds gather in the computer stores to get a look at this new marvel from Apple. And a marvel it is. The Macintosh is truly easy to operate for first-time users. We tested a few novices on the Mac, and they were immediately comfortable with the machine, quickly adapting to the mouse, while enjoying what Apple calls the "user interface." This user interface, which consists of icons and pull-down windows with menus, is the main asset that, Apple hopes, will make the Macintosh a big hit. This interface is what makes the little machine so intriguing.

Apple is not the only firm that thinks the Macintosh will sell well; many major software and peripheral manufacturers are betting on Mac as well. We have talked to many of the companies Apple lists as official third-party developers, and they are all excited about the Macintosh and are in the process of introducing a number of products for the new computer. We are witnessing the creation of a new market, which many firms will join.

We're betting on the Mac, too. We think the Mac is going to be a huge success, which is why we are introducing a new section in this issue to cover the new product. Our goal is to provide you with articles that will help you understand and use your computer to its fullest extent, particularly as it relates to business. This section will deal with the full 32-bit product line, which includes the new Macintosh and new versions of the Lisa. We will feature stories on how to use the Macintosh and the Lisa, from mastering the mouse to making the most of Multiplan. We will also tell you about new products and technological trends. Because of Apple's aggressive educational plan, we will cover Mac on campus as well. We are looking forward to writing about this innovative new product from Apple and encourage your comments and suggestions.

The new section on the Macintosh and the Lisa is not the only addition to *A+*. Responding to popular demand, we have expanded certain sections of the magazine. Rescue Squad is one of our most-read columns. As a result of an avalanche of mail, we are expanding Rescue Squad to try to keep up with your questions! We're also broadening our That's Entertainment section to include more game reviews, features, and product news.

We also provide information on how to use the Apple II series and the Apple III for professional purposes such as word processing, financial management, accounting, database management, graphics, and telecommunications, among others. Each issue we include articles that will help you with your buying decisions, such as choosing a hard disk or a modem. We also provide tutorials on the trickier aspects of computing, such as our "How to dBASE II" series. We feature regular columns such as Thoughtware and Electronic Brainstorming to instruct as well as intrigue you and a monthly programming contest with cash awards.

I am pleased to announce a new regular column called News+ beginning in this issue from the technical editor of *A+*, Fred Davis. He will cover the computer-industry beat for us and keep you up to date on the latest developments, as well as entertain you with the folklore and history of personal computing.

Speaking of *A+*'s new technical editor, I would like to take this opportunity to introduce the other members of the *A+* editorial staff. Since the first issue we have added managing editor Leslie Steere, who comes from Miller Freeman Publications; senior copy editor Eva Langfeldt who came to *A+* from *InfoWorld*; senior staff editor Jane Willson, who is an Apple alumna from the II division as well as the Mac division; assistant editor Ruth Ramberg, who comes to *A+* from Addison-Wesley and the academic world; editorial assistant Candy De Santis, who also harks from Apple; and last, but certainly not least, my faithful assistant and office manager, Gae Brandon, who came with me when I left *InfoWorld* to start *A+*. Along with our free-lance writers, the eight of us produce *A+* each month. We are dedicated to our goal of producing the best and most informative magazine about Apple computers.

Like Apple, we are growing and changing to serve you better. We thank all of you who have written to us to offer suggestions, criticisms, and praise. We thoroughly enjoy reading your letters, so please keep them coming! Thank you for reading *A+* and making us the largest Apple magazine after only our sixth month of publication.

Maggie Canon

See jane™ run

Once there was a time,

before the written word, when people used pictures to communicate. Symbols representing entire ideas were easy to see and understand. And the people were comfortable with this language. And they were happy.

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LETTERS TO THE EDITOR

Dear *A+*,

In *A+* Dispatches (volume 1, issue 1) "A Matter of Policy," it was stated that "no insurance firm appears to be offering a stand-alone personal computer policy yet . . . ." I wish to inform you that this is not correct. According to *Personal Computing* (August 1983), there are three companies that offer such protection, although the extent of coverage and the premiums vary. These companies are:

Columbia National General Agency, Inc.
88 East Broad Street
Columbus, OH 43215
(800) 848-3469

Data Security Insurance Agency, Inc.
4800 Riverbend Road
Boulder, CO 80301
(300) 443-3600

Personal Computer Insurance Agency
1655 Willow Street
P.O. Box 28506
San Jose, CA 95159
(408) 723-8107

I hope you will pass this useful information along to your readers. Thank you.

Frank Slansky, Jr.
Gainesville, FL

Dear *A+*,

I want to personally thank you for the fine content of your editorial in *A+*, Volume 2, Issue 1 [on the subject of computer crime]. More than ever, people who care must play important roles if things are to turn out right in this industry.

All issues have a moral character as legislators are keeping pace with bureaucracy, and this industry moves at the speed of light. To stop and address the ethical values is extremely important for assured future growth.

The favor we can do ourselves if we are in the software business is to keep things straight and honest. Meanwhile, morality in humankind must make up for the lack of sparkling energy of the bureaucracy itself.

Kristjan Ranniste
President
Software Library
Ann Arbor, MI

Dear *A+*,

The January '84 issue of *A+* was the first computer magazine for the Apple that was good, easy, informative reading. Congratulations on a worthwhile publication.

It's too bad, however, that you didn't review Dollars and Sense in your article "Computerizing Your Checkbook."

John T. Ramos
Daly City, CA

Thank you. We have a full review of Dollars and Sense in our March 1984 issue.

Dear *A+*,

In the January 1984 *A+*, you state, in response to a question about garbage collection, "There is no way to prevent or predict these pauses . . ." Untrue!

I wish to call to your attention my articles "Garbagemen Strike" and "Weed Out the Trash" in the August and November 1982 issues of *Call-A.P.P.L.E.* (a publication of the Apple Pugetsound Program Library Exchange, 21246-68th Ave. S., Kent, WA 98032).

There, I explain how the programmer can always reduce, and often totally eliminate, the garbage-collection process by manipulating the string space pointer at locations 111 and 112 (hexadecimal $6F and $70).

Clay Ruth
Staff Writer
Call-A.P.P.L.E.
Dyer, IN

Dear *A+*,

At first when I heard there was to be a new Apple Computer-oriented magazine, I was not enthusiastic at all. We already get *Softalk, Nibble, InCider, Call-A.P.P.L.E., Creative* and *Popular Computing* as gifts from the benefactor of our Community who gave us his own Apple II Plus, two Apple disk drives, Epson MX-80FT, and numerous books and programs.

Then the wonderful January issue came with the article on graphics by Dorothy Clark. Now, I am not all that "gung-ho" about graphics, but what attracted me to the article was the blown-up illustration of binary codes and then their conversion to hexadecimal numbers.

I must confess to having skipped over Part 1 of the article which had been in the December issue (Volume 1, Issue 2), but I immediately went back and toiled through the whole article . . . doing all the routines.

This lady, Dorothy Clark, is a fine teacher. She is to be commended. Most of the books and tutorials and even the highly touted professional programs all seem to start at about the 4th floor, while I am stuck in the basement without elevator or stairs. Maybe it is because I am a latecomer to the computer age and all the beginners' material was covered in earlier periodicals.

Sister Mary Emmanuel, O.P.
Lufkin, TX

Dear *A+*,

I have been studying your new magazine, *A+*, with great interest. Your articles have been most stimulating. However, you have a serious glitch in your article on robotics in *A+* Dispatches, page 24 of Volume 1, Issue 1. You state, "The same machine that can pick up a knight and move it three spaces ahead, two to the right, can also check drill bits on an assembly line."

The knight move in chess is one column to the side and one row forward or backward, performed in either order. The knight always changes the color of

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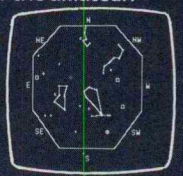

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the square on which it lands; i.e., if it starts on a white square, it ends on a black square and vice versa.

Kenneth Wilmarth
California

Corrections

Page 27 of Volume 2, Issue 3 erroneously states that one of the Macintosh's RS-422 I/O ports is for a 230K-baud modem. In actuality, the I/O port is capable of 230K-baud transmission, but the modem referred to operates only at a speed of 300–1200 baud.

On page 33 of the same issue, we incorrectly identified the members of the Macintosh design team in a picture caption. The caption should have read from left to right: Bill Atkinson, Andy Hertzfeld, Chris Espinosa, George Crow, Joanna Hoffman, Burrell Smith, and Jerry Manock.

We would also like to correct two errors in Volume 2, Issue 2. On page 150 we quoted a price of $39.95 for the Genie 5+5 hard-disk drive; the actual price is $3995. On page 18, we referred to Bank Street Writer from Brøderbund as a "computer-game hit." The program in reality is a word-processing program.

An article "Hardware, Software, and Tupperware" in the Dispatches section of our February 1984 issue described Wallace Micro-Mart, Inc., of Peoria, Illinois, as an Apple computer "mail-order" company. We print below a statement from Wallace Micro-Mart that seeks to clarify that it does not mail-order Apple Computer products.

It stands corrected that Wallace Micro-Mart, Inc. does not mail order Apple Computer, Inc. products and that Wallace Micro-Mart does not condone the mail order of any Apple Computer, Inc. products by any company or individual.

Wallace as an 'Apple only' dealer has supported Apple Computer, Inc. extensively in the Peoria, Illinois, vicinity. Wallace offers complete training, and exceptional after-sale support on Apple computers, and suggests that every Apple computer owner should receive this same respect from all Apple dealers which cannot be offered through the mail in any sense of the word.

Ronald A. Wallace
President
Wallace Micro-Mart, Inc.
Peoria, IL

 CIRCLE 128 ON READER SERVICE CARD

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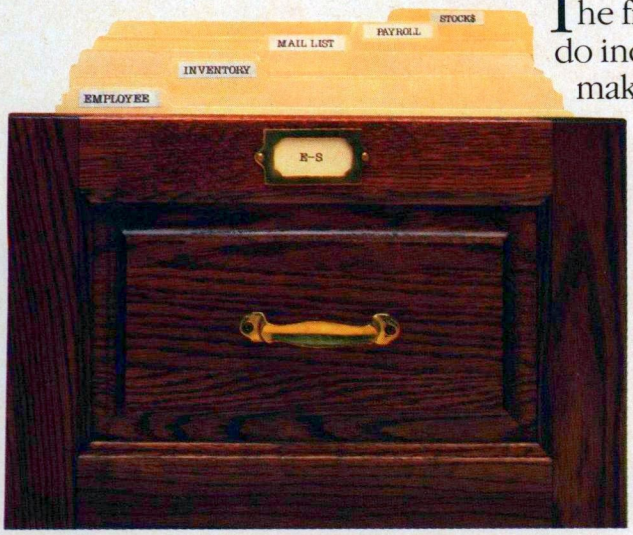

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With REPORT, you can create presentation quality summaries in table form in just minutes. Automatically sorted, calculated, formatted and printed!

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PFS: It's the powerful software that's simple to learn. It's the power of simplicity.

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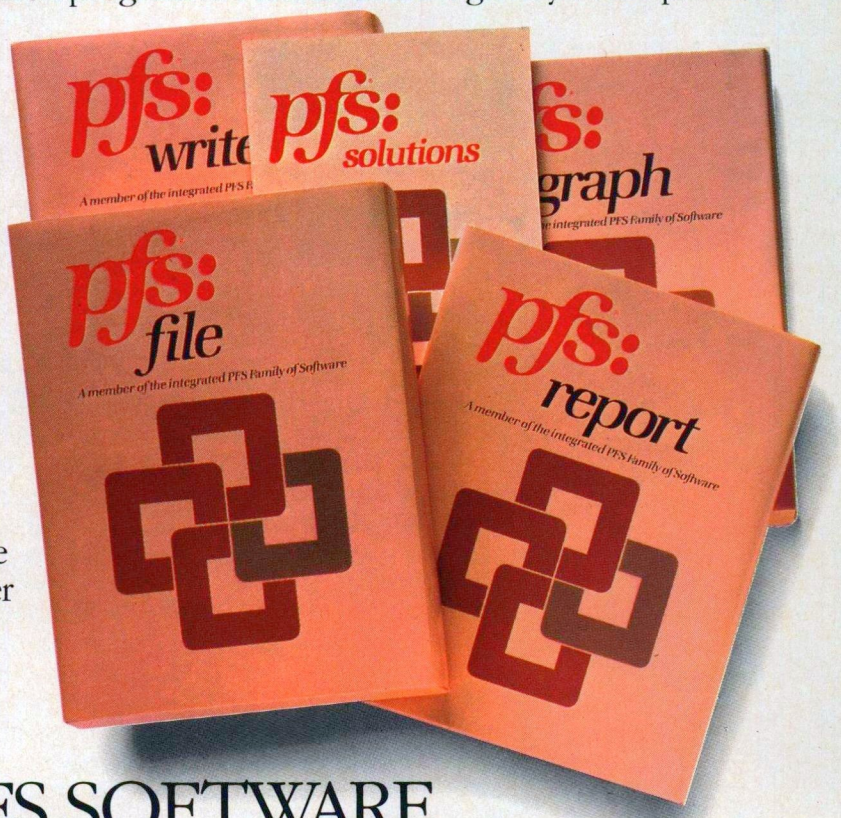

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A+ DISPATCHES

LEARNING FOR DOLLARS

If you want to help kids learn, make it a game, give them a challenge. So say many education pundits. Two companies have taken those words to heart and are sponsoring contests they hope will encourage children to expand their computer literacy and their product awareness.

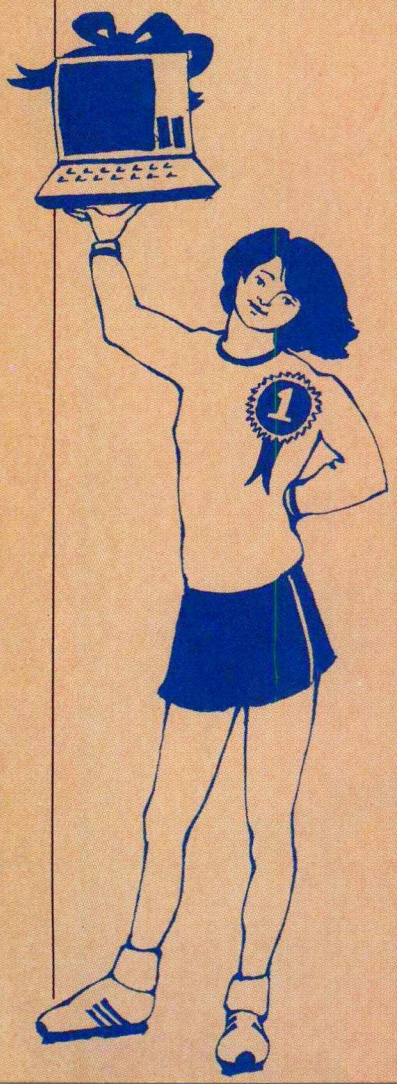
Krell Software Corporation of Stony Brook, New York, is touting The Great American $50,000 S.A.T. Contest.

At stake are prizes of up to $1500 worth of personal-computer equipment. To win, a person must use Krell's College Board S.A.T. Prep Series of software to achieve the highest S.A.T. score or the most improved S.A.T. score.

And for the 18-year-old-and-under set, Kraft (as in cheese) is offering the Kraft Kideo Game Contest. Entrants must submit a written description of a computer game that would teach 3- to 8-year-olds about nutrition.

Put your thinking caps on, kids!

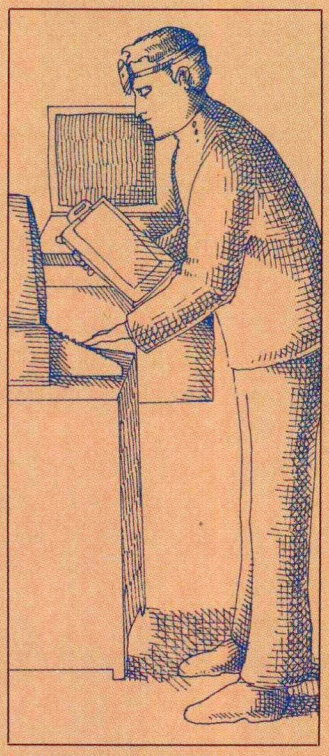
For information about the S.A.T. contest, contact Krell Software at 1320 Stony Brook Road, Stony Brook, NY 11790. For the Kraft contest, write P.O. Box 845, South Holland, IL 60473.



EXTRA CREDIT FOR BUYERS

Only a few months ago, Apple entered the retail credit world with its own contribution to the world of plastic, the Apple Card. Now the Apple Card's credit limit has been extended, or rather, lowered, so that more customers can take advantage of buying computers and computer products on the never-never.

General Electric Credit Corporation offers the Apple Card, which can be used at any of the nation's 800 authorized Apple dealerships. Apple Cards can now finance a minimum of $200 in hardware, as opposed to the card's original bottom line of $825. Customers need no longer purchase a computer to be eligible for a credit purchase, either. Apple hopes consumers will take the card down to the dealer and buy up the raft of new machines and software. Who says you need a friend at Chase Manhattan?



YOU CAN'T FOOL US

We know you're out there. There are a million computer stories in the Naked City . . . tell us a few. *A+* pays $50 for items of news, gossip, or strange-but-true computer stories we can use in these pages.

Include your name, address, and telephone number with each item. (We will preserve your anonymity on request.) All submissions become the property of *A+* magazine and are subject to editing. Please send your stories to Dispatches, c/o *A+* magazine, 11 Davis Drive, Belmont, CA 94002.

WATCH OUT, QUINCY

Apples can do more than keep the doctor away—they can even help forestall the coroner.

For instance, when an epidemiologist at the Memphis and Shelby County Health Department in Tennessee brought his personal Apple II to work, he found it invaluable in organizing data on communicable and venereal diseases, food-poisoning cases, and animal bites. Thanks to the department's new databases, the department can zero in on sectors affected by disease and better formulate countermeasures.

In analyzing animal-bite data, for instance, the department discovered that one popular pet, the German Shepherd, accounted for 27% of all dog bites. This guard dog could actually be a serious health problem, the epidemiologist said.

Another example: the computer program developed to record cases of bacillary dysentery showed researchers that the disease largely affected black children less than nine years old. Comparing printouts of cases by census tract to other socio-economic data confirmed that the disease is almost solely confined to the poor. Now the department knows where to start fighting the illness.

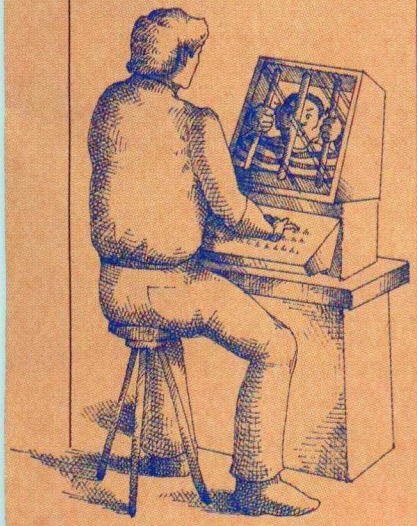
The computer may not be able to stalk into a health administrator's office to demand action, but it can help public-health workers catch a problem before it gets to the coroner.

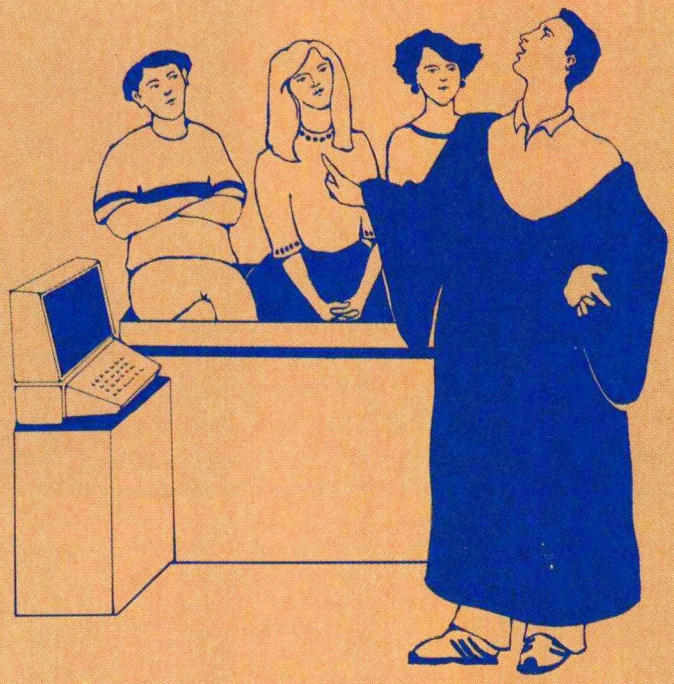
KEEPING HACKERS CLEAN

More and more U.S. teenagers have access to computers at home or at school. According to a recent survey by Teen-Age Research Unlimited in Lake Forest, Illinois, 5% of the respondents had bought a personal computer in the past 12 months—up from 3% the previous year. Ten percent of the teenagers said they had used a personal computer at home that week; one-and-a-half times as many boys worked on the computer keyboard as girls.

With so many teenagers tapping into computers, educators (and government, businesses, and parents) have wondered how to prevent a recurrence of last year's hacker scare, when young computer users broke into computer data banks for the fun of it. Now the Los Angeles County schools have begun several pilot programs to teach computer students the ethics of hacking.

About a dozen of the county's 81 public-school districts teach courses dealing with computer crime, privacy rights, and copyright laws. Students may debate the propriety of specific computer crimes or play the role of the computer executive whose program has been pirated by a hacker.





Los Angeles schools are understandably nervous about the possibility of youthful hackers since the county averages one computer for every 135 students.

And well they might be, because the initial response from their students has been mixed. One Culver City student who admitted he had already broken into a private data bank said, "If you could do it without getting caught, you should."

JUDGE FOR YOURSELF

Can a video game dispense justice? With your help, perhaps. Soon you may be able to hone your own legal knowledge and intuition by comparing them to the expertise of federal and state judges, ruling on 18 different crimes from murder to shoplifting.

Your chance to interpret the law comes when you play two "fun introductions to the criminal justice system," Crime and Punishment and Search and Seizure. Both games were written by lawyer/educators Graeme Newman, acting dean of the School of Criminal Justice at the State University of New York at Albany, and Jack Kress, a professor at Delaware Law School.

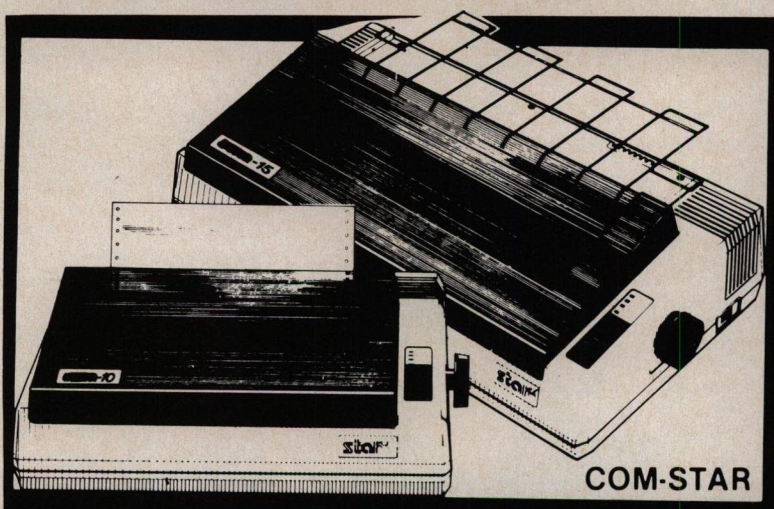
In Crime and Punishment, you get to exercise your "jurist's prudence." You're confronted with a convicted criminal and required to mete out justice as you see fit, based on the information you call up from the game's data banks. Your sentence is then rated against the decisions of actual judges in similar cases. Five gavels appearing on the screen after you've laid down the law indicate that you've walked the same legal path as most other judges. One gavel, jokes Newman, means "you might be better off in a kangaroo court."

Search and Seizure transforms you into a police officer gathering evidence for a randomly chosen crime. Should you give chase, search the premises, fire your weapon, or simply drop the case? (In some instances you garner game points for dropping a case. This is predicated on the assumption that a detective's time is valuable, and a 12-hour-old shoplifting case generally carries less weight than a 2-hour-old kidnapping.)

Coauthor Kress describes these games as being like "Zork with reality," or "text-based 'real' games." The databases for these games derive from research Kress did for the federal government on discrepancies in sentencing. He hastens to add that the point of these games isn't necessarily to turn the player into the "average" judge, but to make players think about the reasons behind a particular sentence. "We're very much activist reformers, my colleague and I," says Kress. "When you don't match the norm of judges, don't say, 'Hey, I'm dumb.' Go out and say, 'Maybe I'm right.' "

Decision Making Systems Ltd., the Newman and Kress company in Wilmington, Delaware, currently offers these games for only the TI 99/4A, but is negotiating for the Apple versions. Kress expects that Apple owners will be taking the law into their own hands sometime this summer.

80 COLUMN PRINTER SALE—$149.00*



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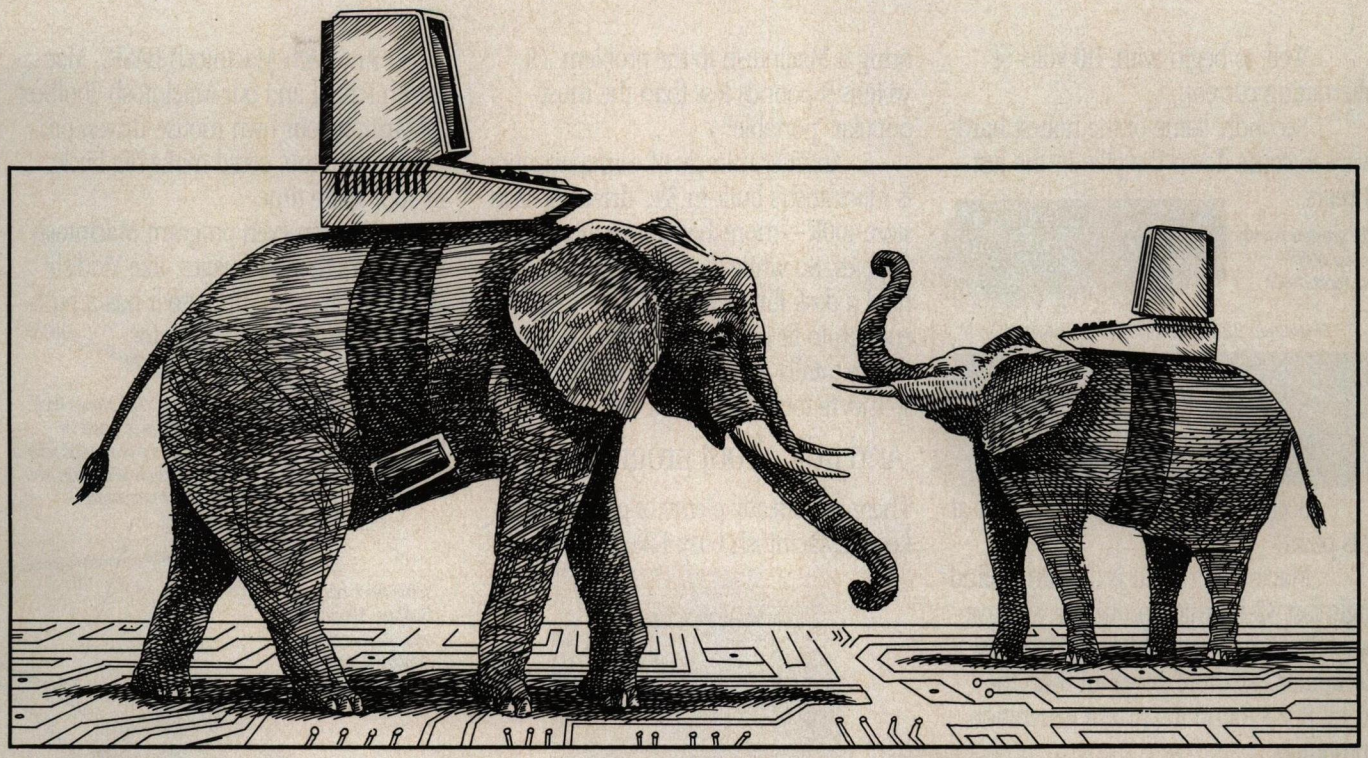
CIRCLE 127 ON READER SERVICE CARD

THOUGHTWARE/BY STEVE ROSENTHAL
How your Apple hangs on to information



MASS MEMORY STORAGE

An Apple without mass memory storage makes a useful calculator or controller, but if you want the full use of your computer, you'll need to equip your machine with more than just its standard memory chips. For an Apple to do its work well, it needs a safe place to store information.

The Apple II family of computers, in deference to the technology and economics of the late 70s, can store data on an audiotape recorder, but the mainstay for all Apples is the magnetic disk. For exotic applications, we now also have a few nondisk alternatives.

In addition to supplying a place to store data that won't fit in memory and that stays available when power is turned off, diskettes are also the principal means for software distribution. But what's best for one of these roles is not always best for the other one.

Never Enough Memory

Early Apple owners often started with as little as 16K (16,000 characters) of random-access memory and still were able to write programs and get enjoyment and useful work from their machines. But one of the virtues of Apples and other early personal computers was that they gave people a glimpse of better possibilities—and most of them required more memory space for more complex programs.

No matter how quickly memory prices fall, uses for extra memory increase more rapidly.

One of the pioneers of the integrated-circuit business, Robert Noyce, pointed out that the number of bits on new memory chips tends to double every two years—but because of the economics of manufacturing, the cost quickly falls to the price of the previous chip generation. As a result of this trend, memory has become cheap enough that most Apple users can afford extra RAM.

No matter how quickly memory prices fall, however, uses for extra memory increase more rapidly. Applesoft BASIC, standard with the Apple II Plus and IIe, requires more memory than the Integer BASIC that came with the older II. ProDOS, the new operating system for the Apple II family, uses more memory than does DOS. Application programs, once mainly short

Introducing Macintosh. What makes it tick. And talk.

Well, to begin with, 110 volts of alternating current.

Secondly, some of the hottest hardware to come down the pike in the last 3 years.

The garden variety 16-bit 8088 microprocessor.

Macintosh's 32-bit MC68000 microprocessor.

Some hard facts may be in order at this point:

Macintosh's brain is the same blindingly-fast 32-bit microprocessor we gave our other brainchild, the Lisa™ Personal Computer. Far more powerful than the 16-bit 8088 found in current generation computers.

Its heart is the same Lisa Technology of windows, pull-down menus, mouse commands and icons. All of which make that 32-bit power far more useful by making the Macintosh™ Personal Computer far easier to use than current generation computers. In fact, if you can point without hurting yourself, you can use it.

Now for some small talk.

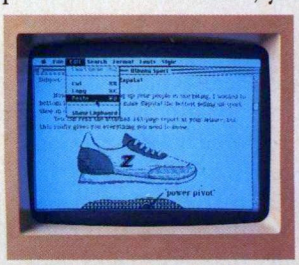
Thanks to its size, if you can't bring the problem to a Macintosh, you can always bring a Macintosh to the problem. (It weighs 9 pounds less than the most popular "portable.")

Another miracle of miniaturization is Macintosh's built-in 3½" drive. Its disks store 400K—more than conventional 5¼" floppies. So while they're big enough to hold a desk full of work, they're small enough to fit in a shirt pocket. And, they're totally encased in a rigid plastic so they're totally protected.

And talk about programming.

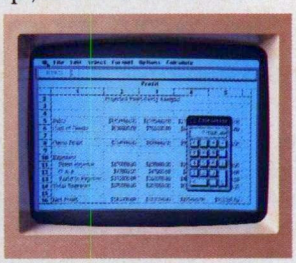
There are already plenty of programs to keep a Macintosh busy. Like MacPaint,™

a program that, for the first time, lets a personal computer produce virtually any image the human hand can create. There's more software on the way from developers like Microsoft,® Lotus,™ and Software Publishing Corp., to mention a few.



Macintosh automatically makes room for your illustrations in the text.

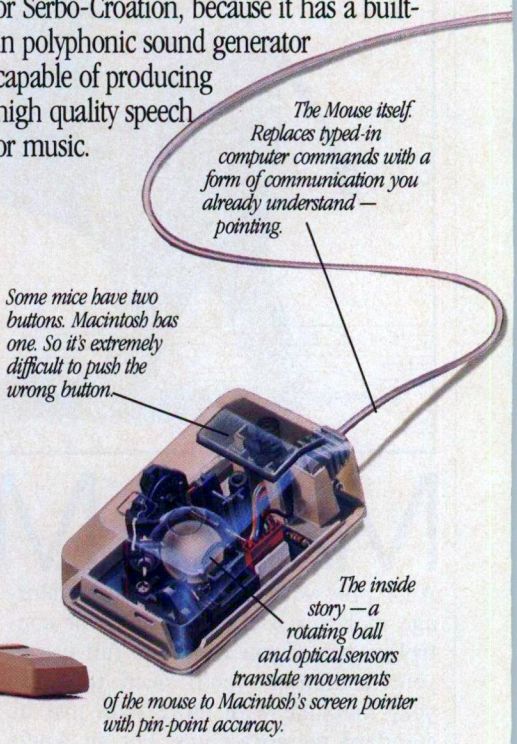
MacPaint produces virtually any image the human hand can create.



Microsoft's Multiplan for Macintosh.

And with Macintosh BASIC, Macintosh Pascal and our Macintosh Toolbox for writing your own mouse-driven programs, you, too, could make big bucks in your spare time.

You can even program Macintosh to talk in other languages, like Yiddish or Serbo-Croation, because it has a built-in polyphonic sound generator capable of producing high quality speech or music.



The Mouse itself. Replaces typed-in computer commands with a form of communication you already understand — pointing.

Some mice have two buttons. Macintosh has one. So it's extremely difficult to push the wrong button.

The inside story — a rotating ball and optical sensors translate movements of the mouse to Macintosh's screen pointer with pin-point accuracy.

All the right connections.

On the back of the machine, you'll find built-in RS232 and RS422 AppleBus serial communication ports. Which means you can connect printers, modems and other peripherals without adding $150 cards. It also means that Macintosh is ready to hook in to a local area network. (With AppleBus, you will be able to interconnect up to 16 different Apple computers and peripherals.)

Should you wish to double Macintosh's storage with an external disk

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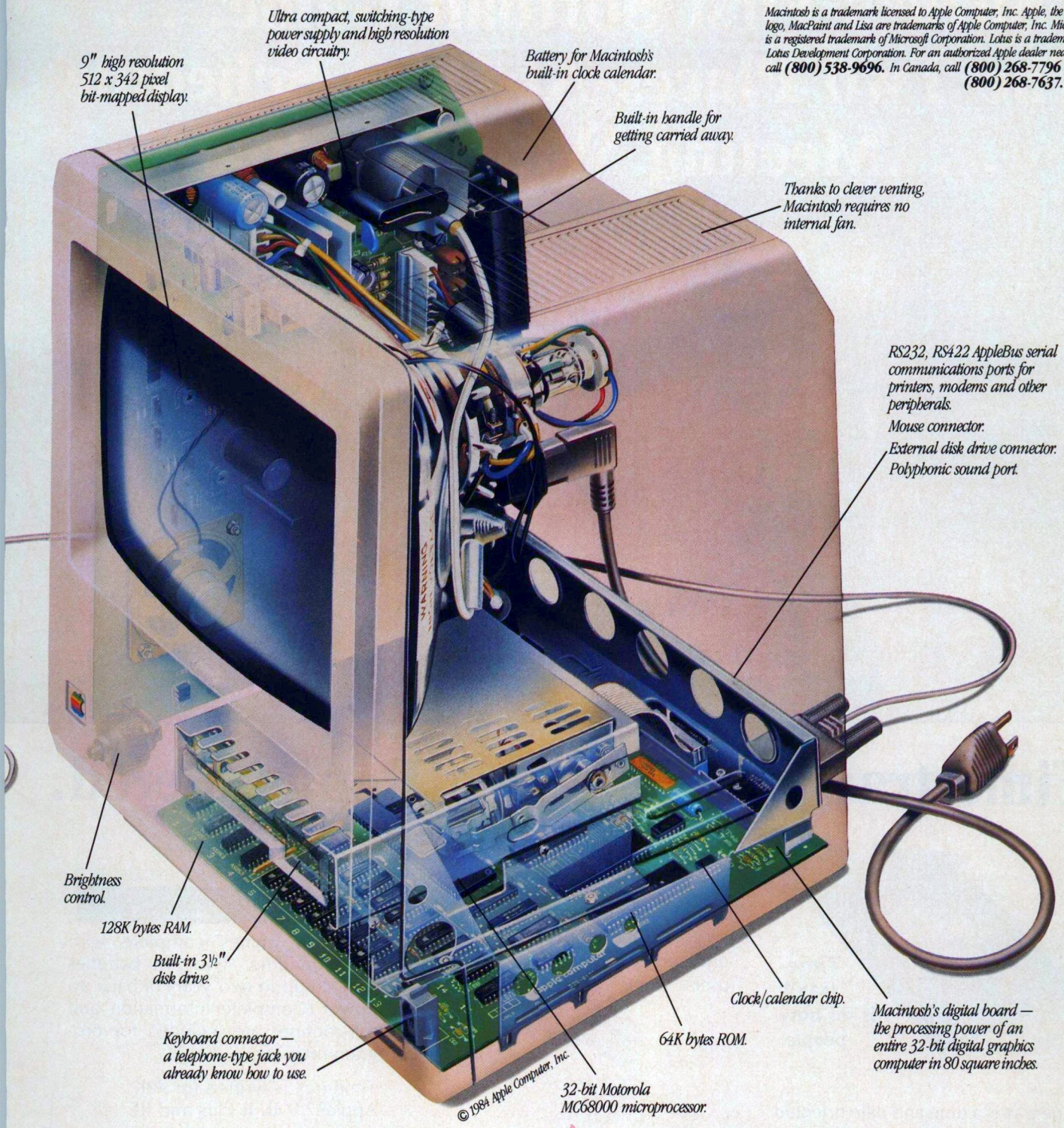

drive, you can do so without paying for a disk controller card—that connector's built-in, too.

There's also a built-in connector for Macintosh's mouse, a feature that costs up to $300 on computers that can't even run mouse-controlled software.

One last pointer.

Now that you've seen some of the logic, the technology, the engineering genius and the software wizardry that separates Macintosh from conventional computers, we'd like to point you in the direction of your nearest authorized Apple dealer.

Over 1500 of them are eagerly waiting to put a mouse in your hand. As one point-and-click makes perfectly clear, the real genius of Macintosh isn't its 32-bit Lisa Technology, or its 3½" floppy disks, or its serial ports, or its software, or its polyphonic sound generator.

The real genius is that you don't have to be a genius to use a Macintosh.

You just have to be smart enough to buy one.

Soon there'll be just two kinds of people. Those who use computers. And those who use Apples.

Suzie's First Softball Game. . . The Two Places-At-Once Schedule . . .Meeting With The Boss.

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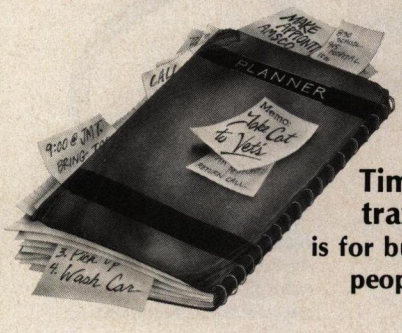

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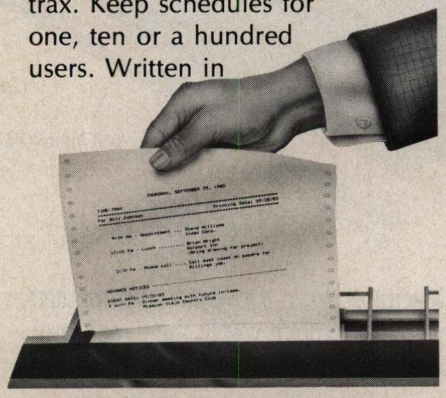

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CIRCLE 111 ON READER SERVICE CARD

programs in BASIC, now are often scores of pages long in any of a dozen computer languages.

The need for memory space is even more acute on some of the newer Apple machines. The Macintosh, which in its initial release had 128K of RAM, uses single programs with an operating system that alone would more than fill that space if you read it into memory all at once. Even the Lisa, which has up to a megabyte of memory, doesn't leave enough room for the entire operating system and common utilities to fit in memory at the same time.

Mass Storage As Memory Extension

Consequently, one of the principal functions of a disk-storage system is to hold sections of programs and data that are too big to fit into the computer's active memory. In this use, the diskette can act like an electromechanical ROM (read-only memory) chip, or it can act like read/write memory similar to the main RAM memory.

Reliability is particularly important because sections of the operating system or programs are read in time after time.

Both speed and reliability are important when diskettes serve this function. Speed is important because you have to wait in the middle of a task while sections of the operating system or programs load into memory. You'll probably find that if the delay is more than a second, your attention starts to wander.

Reliability is particularly important because sections of the operating system or programs are read in time after time, and any errors may cause the failure of a program and a consequent loss of data.

Unfortunately, speed and reliability tend to be inversely related, at least within any given price class. All computer designers must decide which asset to emphasize.

At Apple, the decision has always leaned toward reliability, at the cost of speed. The II family disk drives are roughly comparable in speed to other drives introduced at the same time, but more recent 5¼-inch drives find and transfer data much faster than do the Apple drives.

Hard Disks Run Faster

The need to limit the rotation of a disk to a speed that won't cause mechanical problems affects the rate at which data can be stored or read on a floppy disk. Disk drives that use rigid platters ("hard disks") can spin their disks much more quickly than floppy disks, and they cut waiting time and allow faster data transfer, as well.

Although the Apple II family was not originally designed to use hard disks, the III, the Lisa, and the Macintosh were all created to do so—these machines can also run with floppy disks alone. The more rapid rate of data location and transfer allows software designers to make greater use of the disk without incurring unacceptable delays. The software for these machines tends to be separated into pieces, only some of which are in main memory at any given time.

Even though hard-disk drives are approximately ten times faster than floppy-disk drives, the Apple ProFile hard-disk drive appears to be slower than the hard-disk drives some other systems use. Again, much of that difference can be traced to design philosophy—a ProFile should have fewer data errors than faster disk drives do.

Enter the RAM Disk

With memory prices steadily falling, you might think that it's possible to add more and more memory to existing computers in order to catch up with the demands of at least older programs and operating systems. Unfortunately, there's usually a limit on how much main memory a processor can keep track of and on how much the software can use directly.

One solution to the memory crunch that's becoming increasingly popular is to use some RAM chip memory as a disk emulator. From the point of view of the computer, this memory mimics the operation of a disk drive, but does not involve a wait for mechanical operations. Two such boards are discussed at length in "Disks in RAM's Clothing" on page 46.

By emulating disk memory instead of main memory, RAM disks can use existing software that expects to work with disks (although sometimes you need software patches to take the lack of mechanical delay into account). Similarly, a disk controller or a special control circuit can manage the memory as a series of blocks instead of requiring the processor to keep track of each added byte.

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CIRCLE 125 ON READER SERVICE CARD

When you use them as memory extensions for programs or the operating system, RAM disks provide an outstanding combination of reliability and speed. Input/output delays on most RAM disk systems are almost negligible, and the transfer rate is usually as fast as the Apple's ability to accept information.

Reliability is also good on a RAM disk, because it has no moving parts. You can read and write data as frequently as you like to the same locations, and they won't wear out—a problem with diskettes. A well-designed RAM disk board shouldn't ever lose a bit of data, unless you have an outright chip failure or other hardware problem.

A more exotic form of solid-state storage that has recently appeared for the Apple is magnetic bubble memory. Bubble memory is like a cross between magnetic-disk and RAM memory. It stores data in moving magnetic patterns in a special crystalline material. Because it has no mechanical parts, it's quite reliable, but because data resides in long loops and moves past a read/write station in each chip, access time for reading and writing can be almost as long as with a disk drive. Unlike ordinary RAM chips, bubble-memory chips return the information they store, even when you turn off the power.

No Disk Is Big Enough

For storing programs and data, speed and reliability are particularly important, but capacity is also a significant factor. Just as software always grows to overflow available main memory, the amount of data stored on disk grows ever larger.

Actually, two different measures of capacity are of concern. For storing the operating system, individual programs, and data, the most important consideration is how much data you can access at a time. For archival storage, the cost of storing large amounts of data is a more important factor.

Storage that a computer can read from or write to on command, such as on a hard disk or floppy disk in a drive, is called "secondary" storage or "passive" memory ("primary" storage or "active" memory is the memory chips that the computer can read from and write to directly). Larger amounts of secondary storage permit you to use more complex, segmented programs and larger files and to swap files quickly for multiuser systems.

The amount of data that a disk drive can store depends on the design of the disk drive and on how the data is encoded into bit patterns. Again, there is a trade-off between reliability and density. Denser storage allows less room for slight errors and is thus less reliable.

Apple disk controllers use an advanced encoding method known as group-code recording. As a result, the Apple Disk II drive packs 143 kilobytes into 35 tracks of a single-sided diskette; other brands hold as little as 80K in that same space. Some other computers have now gone to double-sided, double-density disks, however, some with as many as 80 tracks per side—for as much as 800K on a 5¼-inch disk (the amount a Lisa 1 diskette holds).

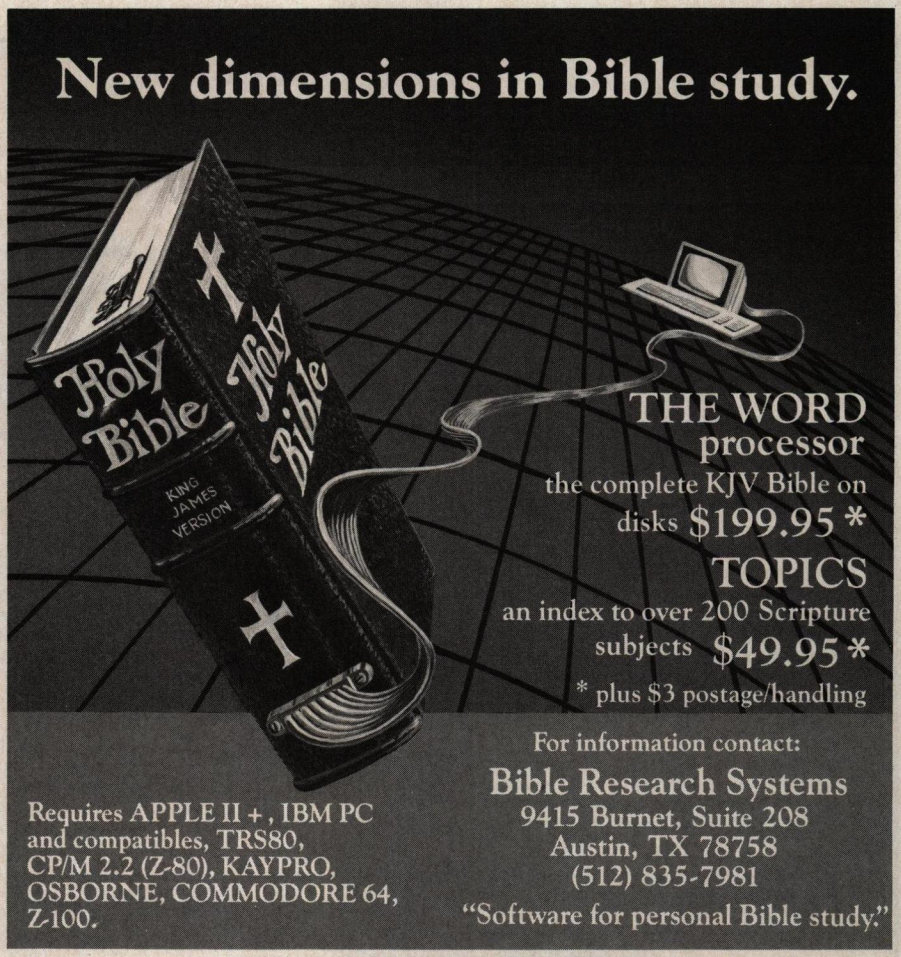
Larger amounts of secondary storage permit you to use more complex, segmented programs and larger files.

Apple has chosen not to upgrade the disks for the II family yet, so you'll have to turn to other companies if you want high-capacity drives for these machines. Some of these drives mimic the operation of multiple Apple drives and can use the same controller. Others, however, are based on a slightly different drive mechanism and therefore require a special controller.

If you want more data storage, you can also turn to a hard disk. The ProFile hard-disk drive used on the Apple III and the original Lisa stores five megabytes (equivalent to about 35 diskettes), and you can connect multiple drives if you need to. The new Lisa 2 is available with a ten-megabyte internally mounted drive. Apple has recently announced that the ProFile drive will be available for the hard-disk II family, one of the company's main reasons for offering ProDos for the II.

Hard-disk drives are significantly more expensive than floppy drives, but only if you are looking at total cost. If you compare cost per unit of storage, a five-megabyte disk for a few thousand dollars is still much cheaper than 35 floppy drives at a few hundred each.

Backing up data on floppy-disk drives is easy on a system with two or more drives. Apple supplies disk-copy programs for all its machines, and commercial disk-copy programs offer extra features for the Apple II family. On sin-



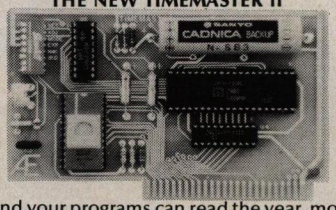
CIRCLE 162 ON READER SERVICE CARD

Apple Peripherals Are All We Make

That's Why We're So Good At It!

THE NEW TIMEMASTER II

Automatically date stamps files with PRO-DOS



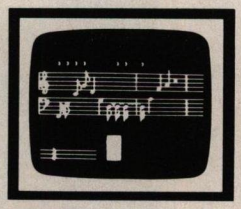
NEW 1984 DESIGN
An official PRO-DOS Clock

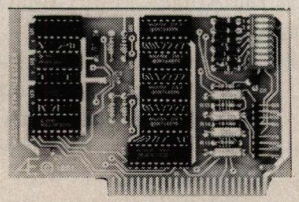
- Just plug it in and your programs can read the year, month, date, day, and time to 1 millisecond! The only clock with both year and ms.
- NiCad battery keeps the TIMEMASTER II running for over ten years.
- Full emulation of ALL other clocks. Yes, we emulate Brand A, Brand T, Brand P, Brand C, Brand S and Brand M too. It's easy for the TIMEMASTER to emulate other clocks, we just drop off features. That's why we can emulate others, but others CAN'T emulate us.
- The TIMEMASTER II will automatically emulate the correct clock card for the software you're using. You can also give the TIMEMASTER II a simple command to tell it which clock to emulate (but you'll like the Timemaster mode better). This is great for writing programs for those poor unfortunates that bought some other clock card.
- Basic, Machine Code, CP/M and Pascal software on 2 disks!
- Eight software controlled interrupts so you can execute two programs at the same time (many examples are included).
- On-board timer lets you time any interval up to 48 days long down to the nearest millisecond.

The TIMEMASTER II includes 2 disks with some really fantastic time oriented programs (over 40) including appointment book so you'll never forget to do anything again. Enter your appointments up to a year in advance then forget them. Plus DOS dater so it will automatically add the date when disk files are created or modified. The disk is over a $200.00 value alone—we give the software others sell. All software packages for business, data base management and communications are made to read the TIMEMASTER II. If you want the most powerful and the easiest to use clock for your Apple, you want a TIMEMASTER II.

PRICE $129.00

Super Music Synthesizer
Improved Hardware and Software

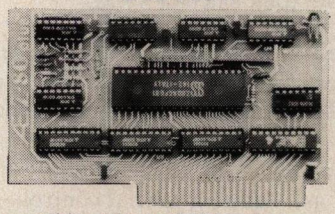




- Complete 16 voice music synthesizer on one card. Just plug it into your Apple, connect the audio cable (supplied) to your stereo, boot the disk supplied and you are ready to input and play songs.
- It's easy to program music with our compose software. You will start right away at inputting your favorite songs. The Hi-Res screen shows what you have entered in standard sheet music format.
- Now with new improved software for the easiest and the fastest music input system available anywhere.
- We give you lots of software. In addition to Compose and Play programs, 2 disks are filled with over 30 songs ready to play.
- Easy to program in Basic to generate complex sound effects. Now your games can have explosions, phaser zaps, train whistles, death cries. You name it, this card can do it.
- Four white noise generators which are great for sound effects.
- Plays music in true stereo as well as true discrete quadraphonic.
- Full control of attack, volume, decay, sustain and release.
- Will play songs written for ALF synthesizer (ALF software will not take advantage of all our card's features. Their software sounds the same in our synthesizer.)
- Our card will play notes from 30HZ to beyond human hearing.
- Automatic shutoff on power-up or if reset is pushed.
- Many many more features.

PRICE $159.00

Z-80 PLUS!



- TOTALLY compatible with ALL CP/M software.
- The only Z-80 card with a special 2K "CP/M detector" chip.
- Fully compatible with microsoft disks (no pre-boot required).
- Specifically designed for high speed operation in the Apple IIe (runs just as fast in the II+ and Franklin).
- Runs WORD STAR, dBASE II, COBOL-80, FORTRAN-80, PEACHTREE and ALL other CP/M software with no pre-boot.
- A semi-custom I.C. and a low parts count allows the Z-80 Plus to fly thru CP/M programs at a very low power level. (We use the Z-80A at fast 4MHZ.)
- Does EVERYTHING the other Z-80 boards do, plus Z-80 interrupts.

Don't confuse the Z-80 Plus with crude copies of the microsoft card. The Z-80 Plus employs a much more sophisticated and reliable design. With the Z-80 Plus you can access the largest body of software in existence. Two computers in one and the advantages of both, all at an unbelievably low price.

PRICE $139.00

Viewmaster 80

There used to be about a dozen 80 column cards for the Apple, now there's only ONE.

- TOTALLY Videx Compatible.
- 80 characters by 24 lines, with a sharp 7x9 dot matrix.
- On-board 40/80 soft video switch with manual 40 column override
- Fully compatible with ALL Apple languages and software—there are NO exceptions.
- Low power consumption through the use of CMOS devices.
- All connections are made with standard video connectors.
- Both upper and lower case characters are standard.
- All new design (using a new Microprocessor based C.R.T. controller) for a beautiful razor sharp display.
- The VIEWMASTER incorporates all the features of all other 80 column cards, plus many new improvements.

	PRICE	BUILT IN SOFTSWITCH	SHIFT KEY SUPPORT	LOW POWER DESIGN	80 COLUMN HOME	7x9 DOT MATRIX	LIGHT PEN INPUTS	40 COLUMN OVERRIDE	INVERSE CHARACTERS
VIEWMASTER	179	YES	YES	YES	YES	YES	YES	YES	YES
SUPRTERM	MORE	NO	YES	NO	NO	NO	NO	YES	YES
WIZARD80	MORE	NO	NO	NO	NO	YES	NO	YES	YES
VISION80	MORE	YES	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	YES	NO	NO	NO	NO	YES	YES
VIEWMAX80	MORE	YES	YES	NO	NO	YES	NO	NO	YES
SMARTERM	MORE	YES	YES	NO	NO	NO	YES	YES	NO
VIDEOTERM	MORE	NO	NO	YES	NO	YES	YES	NO	YES

The VIEWMASTER 80 works with all 80 column applications including CP/M, Pascal, WordStar, Format II, Easywriter, Apple Writer II, VisiCalc, and all others. The VIEWMASTER 80 is THE MOST compatible 80 column card you can buy at ANY price!

PRICE $179.00

MemoryMaster IIe 128K RAM Card

- Expands your Apple IIe to 192K memory.
- Provides an 80 column text display.
- Compatible with all Apple IIe 80 column and extended 80 column card software (same physical size as Apple's 64K card).
- Can be used as a solid state disk drive to make your programs run up to 20 times FASTER (the 64K configuration will act as half a drive).
- Permits your IIe to use the new double high resolution graphics.
- Automatically expands Visicalc to 95 K storage in 80 columns! The 64K config. is all that's needed, 128K can take you even higher.
- PRO-DOS will use the MemoryMaster IIe as a high speed disk drive.
- Precision software disk emulation for Basic, Pascal and CP/M is available at a very low cost. NOT copy protected.
- Documentation included, we show you how to use all 192K.

If you already have Apple's 64K card, just order the MEMORYMASTER IIe with 64K and use the 64K from your old board to give you a full 128K. (The board is fully socketed so you simply plug in more chips.)

MemoryMaster IIe with 128K	**$249**
Upgradeable MemoryMaster IIe with 64K	**$169**
Non-Upgradeable MemoryMaster IIe with 64K	**$149**

Our boards are far superior to most of the consumer electronics made today. All I.C.'s are in high quality sockets with mil-spec. components used throughout. P.C. boards are glass-epoxy with gold contacts. Made in America to be the best in the world. All products work in the APPLE IIE, II, II+ and Franklin. The MemoryMaster IIe is IIe only. Applied Engineering also manufactures a full line of data acquisition and control products for the Apple; A/D converters and digital I/O cards, etc. Please call for more information. All our products are fully tested with complete documentation and available for immediate delivery. All products are guaranteed with a no hassle **THREE YEAR WARRANTY.**

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gle-drive machines, you can also copy diskettes by reading the information into memory, switching diskettes, and then writing the data out again on the other diskette.

Backing up a hard disk can be more difficult. Because the amount of data stored on the disk is so large, using floppies as a regular backup for entire hard disks is impractical. Some users do "selective backups," periodically recording on floppies any important files that have changed since the last time they were backed up. Some hard-disk systems from outside companies have an external-cartridge tape drive, allowing the hard disk's contents to be recorded on removable tapes or hard-disk cartridges. This setup solves this problem nicely and allows rapid, convenient, off-line memory storage.

Nonvolatile storage

Along with extending the space for current programs and data, another important function of mass-storage systems is to save data and programs when you turn the power off. Although all Apple computers do have some amount of built-in permanent memory (ROM), its main function is to get the machine running so it can read in an operating system and programs from the disk.

Any data or programs that you type into the machine are not stored in permanent memory, and the normal RAM on the computer loses its contents if you turn off the power (or if it even flickers for a fraction of a second).

When it comes to large amounts of archival storage, however, the hard-disk drive is at a disadvantage. In drives in which the disk is permanently mounted in the drive, the total amount that a hard-disk drive can store equals its on-line capacity. In contrast, you can store as much data with a floppy drive as your budget and shelf space for disks will allow. If you end up storing a lot of information (as is the case in most business uses and for dedicated game players), the cost of the diskettes will be more significant than the cost of the drive.

Removable hard-disk drives

In the last year, several companies have announced removable-cartridge hard-disk drives for the Apple. These drives offer the advantages of hard disks, along with the removability of floppies. Although costs are in flux, they seem to be higher than floppies for archival storage.

A less expensive alternative is a tape-cartridge storage device, such as The Bank from Corvus of San Jose, California (see Product News, this issue).

CIRCLE 190 ON READER SERVICE CARD

You can erase data that's in an Apple's memory or even on a disk drive in a twinkle of an eye. A disk can erase data as fast as it can rotate. To prevent human error or hardware failure from causing catastrophic loss, it's good practice to make a copy of any vital data and keep it "off-line"—out of the computer's direct control.

It's good practice to make a copy of any vital data and keep it 'off line.'

Improved memory designs use less power than do older chips, so you can probably use some kind of battery backup. Most such systems store data only for hours or days, though—not long enough for permanent copies. In addition, this kind of backup saves only the data that was in memory when you turned the computer off, rather than all the data and programs you've entered previously.

One of the biggest advantages of diskette or tape storage, then, is its ability to retain data without power. Because the data on a diskette is stored as a magnetic pattern, even if you unplug the drive and leave the diskette sitting for years, the pattern will still remain.

Diskettes and tapes all use the so-called hysteresis effect—once a certain amount of magnetism has been applied to certain materials, the magnetic pattern stays in place until the surface is again placed in a strong magnetic field. Heat and stray magnetic fields can destroy stored patterns, which is why you're supposed to keep diskettes out of the way of electric motors, telephones, the tops of monitors, heaters, and unventilated cars in warm weather.

Magnetic bubble memories are also nonvolatile. If you want to use an Apple for an application in which disk drives might not do well (in a dusty environment, for example), a magnetic bubble memory will keep your data safe and sound even when you pull the plug.

Diskettes for Software Distribution

Software is not really soft, it is ethereal—the actual instructions are like music or recipes. To be able to distribute software, you have to write it down on something, just as music or recipes

You've seen what I can do during the day, You should see what I can do at night.

Your computer has the legs to do more work than you've been asking it to. Most computers in the evening are, simply, off. But now your Apple can act as the hub of a communications system.

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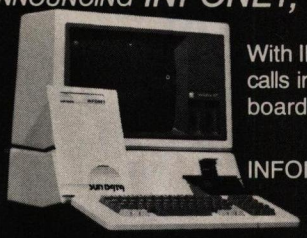

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CIRCLE 317 ON READER SERVICE CARD

are written down on paper.

Some game software is distributed on cassette tape, but the vast majority of commercial software is sold as prerecorded floppy diskettes. You can buy the software, take it home, and load and run it just like a program you've written and stored on disk yourself.

Software companies' priorities for disks are different from those of users. Because software on diskettes is easy to copy, many software companies have put a lot of effort into "copy-protecting" their diskettes. Although any copy-protection scheme can be defeated with enough effort, the idea is to make copying software more difficult than it's worth for most users.

Software for Apple computers is particularly likely to be protected, because the design of the disk controllers allows more alterations of the diskette than the controller-chip designs of the IBM Personal Computer and other machines do. In addition, Apple drives can read and write between the standard track positions, spots that standard disk-copying programs don't copy.

Many protection methods reduce the margin for correct reading of disks.

Unfortunately, many protection methods reduce the margin for correct reading of disks, as does high-speed duplication of protected or unprotected software—most software companies do promise to replace disks that are defective on receipt. Fortunately, Apple's choice of greater reliability over speed or capacity helps alleviate this problem.

As for the future of mass storage for Apples, the directions are not yet clear. A higher-capacity floppy-disk drive for the Apple II family is long overdue, and even the ten-megabyte drive in the Lisa may be limiting for some uses. Macintosh hard disks are available from outside vendors such as Tecmar and Davong (see Macintosh Product News, page 104). Magnetic bubble memories may yet make a significant impact, especially if the price of the chips keeps falling. But with reports of high-capacity three-inch hard disks and four-megabit RAM chips already in development, I think you can look for more RAM disks, smaller hard disks, and larger-capacity removable disks within five years. ✚

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★ **CENTRAL PT.**, Filer. Utility & Apple DOS	$ 20	$ 15
μ-SCI MICRO-SCI ★ A2, 143K Disk Drive	$ 479	$ 229
A2 Controller Card	$ 100	$ 79
★ A40, 160K, Drive	$ 449	$ 299
★ A70, 286K, Drive	$ 599	$ 299
A40 A70 Controller	$ 100	$ 79
1/2 HIGH DRIVES ALPS, A40, Belt Drive, 163K	$ 299	$ 199
TEAC, T40, Direct Drive, 163K	$ 349	$ 239
TEAC, T80, Double Sided, 326K	$ 449	$ 329
Controller Card by ComX	$ 110	$ 59
Rana Elite 1, 163K, 40 Track	$ 379	$ 259
Elite 2, 326K, 80 Track	$ 649	$ 429
Elite 3, 652K, 160 Track	$ 849	$ 539
Elite Controller	$ 145	$ 89

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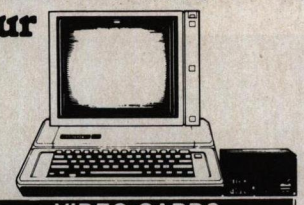
★ **ALS**, ADD Ram (II+)	16K	$ 100	$ 49
★ **ComX**, 80 col. +64K RAM, for IIe, 1 Yr. Wty		$ 199	$ 99
★ RAM Card, 1 Yr. Wty. (II+)	16K	$ 179	$ 39
★ **Microsoft**, RAM Card (II+)	16K	$ 100	$ 69
★ **Titan/Saturn** RAM Card (II+)	32K	$ 249	$ 169
RAM Card (II+)	64K	$ 425	$ 299
RAM Card (II+)	128K	$ 599	$ 399



VIDEO CARDS

★ **ALS**, Smarterm II (+ or e) SPECIAL	$ 179	$ 129
★ **ComX**, 80 col. +64K RAM (IIe) 1 yr. wty.	$ 199	$ 99
★ **Videx**, VideoTerm 80 col. (+ or e)	$ 279	$ 189
★ UltraTerm (+ or e)	$ 379	$ 279
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Enhancer II (II+)	$ 149	$ 99
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★ **CCS**, Serial Interface 7710 (Set BAUD)	$ 150	$ 99
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Kraft, Joystick (Ap II/II+)	$ 65	$ 49
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M&R, Sup R fan (+ or e)	$ 50	$ 39
★ **Microsoft**, Z80 Softcard (+ or e)	$ 345	$ 345
★ Z80 Softcard Plus (+ or e)	$ 465	$ 465
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★ **Orange Micro**, Grappler Plus (e or +)	$ 175	$ 119
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RH Electronics, Super Fan II	$ 75	$ 59
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TG Products, Game Paddles (II+)	$ 40	$ 29
Joystick (II+)	$ 60	$ 45
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Market Microscope	$ 700	$ 525
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★ List Handler	$ 50	$ 35
★ Handler Pak (Word, List & Spell)	$ 130	$ 89
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(specify + or e) PFS: Report	$ 125	$ 84
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BudgeCo., Pinball Constr. Set	$ 40	$ 27
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MACHINE LANGUAGE

MASS STORAGE
BY STEVE ROSENTHAL

A short glossary of mass memory storage

ACCESS TIME—the amount of time between when a computer asks for data from the disk (or needs to write to it) and when the data can be transferred. It's the time the head takes to move in or out to the correct track (the seek time) plus the time for the right spot on the diskette to appear under the read/write head (the rotational delay). Typical times for Apple-family drives are under half a second. Hard disks have faster access times because their disks turn faster than floppies, and their heads move to the right track more quickly.

ANSI DRIVE—a disk drive with interfaces and specifications that meet an industry standard based on the original Shugart 8-inch and 5¼-inch drives. Apple drives are nonstandard. ANSI drives can work with Apples only with special controllers.

BOOT—to start up DOS by reading it in from a diskette. DOS is not built into the permanent (ROM) memory, so you must read in a new copy after you've turned off the Apple. Similarly, the III must read in ProDOS, and the Lisa and the Macintosh must read in parts of their operating systems from disk.

BOOT DRIVE—the drive that the computer reads when you reset it or first turn it on to find a copy of the operating system. On an Apple II, it's normally drive 1 connected to the controller in slot 6.

BUBBLE MEMORY—a type of memory that stores data as patterns of magnetization on tiny crystalline chips. Bubble memories have no mechanical parts, so they're small and reliable, but they're slower than regular semiconductor memory. Like diskettes, bubbles retain data even when you turn the power off. You can buy bubble-memory cards for Apples.

CONSTANT ANGULAR VELOCITY (CAV)—the way most computers other than Apples store data on diskettes. The diskettes always rotate at the same speed, and the same amount of data is written on each track. This method crowds the data on the inner tracks closer together, increasing the chance of errors. Apples use constant linear velocity.

CONSTANT LINEAR VELOCITY (CLV)—the way Apple computers store data on diskettes. With this method, the rotation rate of the disk changes as the head moves in and out, so data on the longer outer tracks has just as much space as data on the shorter inner tracks. Although this approach requires more complexity in the control circuits, it makes the recording process more reliable.

CONTROLLER—the card that translates commands and data from the Apple into signals for the disk drive. Apple controllers use custom circuits instead of the controller chips most other computers use, which gives the software and hardware better control of the drive.

DEFAULT DRIVE—the drive in which read and write operations take place if you don't supply a drive number in a command. In DOS, it starts out as drive 1 and is normally the last drive you've referred to.

DMA—an abbreviation for *direct memory access*, the ability of a disk controller or other card to transfer data to and from memory without sending it through the CPU chip. Some hard-disk controllers use DMA and can transfer data as fast as the memory chips in the Apple allow (about ten times as fast as a floppy-disk drive).

DOUBLE-DENSITY—a method of recording on a diskette or tape using some of the bit positions that are otherwise used for clock (timing) pulses for data. It allows a diskette to hold twice as much data as usual. Standard Apple diskettes don't use this method.

DOUBLE-HEADED—disk drives that write on the top as well as on the bottom side of diskettes. Standard Apple drives are single-headed.

GROUP-CODE RECORDING (GCR)—a method of storing data on diskettes or tape in which small groups of bits are stored instead of each bit by itself. This saves on space needed for timing and other synchronizing pulses, but does require additional software or hardware to translate strings of bits to groups. Apple disk drives use GCR.

HALF TRACK—a position between the normal 35 concentric magnetic circle patterns where Apple disk drives normally store data. Because the Apple can control the drive's stepper motor directly, it can have the head positioned between tracks. Recording on the half tracks is one component of many copy-protection methods.

HARD DISK—a disk that uses a rigid platter rather than the bendable coated Mylar of floppy disks. Most hard disks rotate faster than floppy disks and "fly" the head slightly above the disk surface instead of letting it touch the disk, allowing them to transfer data faster.

HARD-SECTORED—disks that use extra holes around the inner ring or outer track to keep track of where information is stored. Apple products use soft-sectored disks.

HELLO PROGRAM—a program on a DOS diskette that automatically runs when you boot the diskette. The program doesn't actually have to be named HELLO, but that's the common practice. The INIT program puts the HELLO program on a diskette or at least reserves space for it.

MASTER DISKETTES—diskettes that have a copy of DOS in a form that Apples with any amount of memory can use (DOS in self-relocating form).

PREBOOT—a special program that tells an Apple how to read a nonstandard disk or how to use unusual peripherals. You run the preboot and then boot the nonstandard disk. Many copy-protected software packages require a preboot for use on hard disks or with special display cards.

RAM DISK—a block of chip memory that simulates the operation of a disk drive. Because you don't have to wait for mechanical operations, you can store data away or retrieve it from a RAM disk in most applications significantly faster than with a floppy or even hard disk.

SECTOR—a unit of disk space within a track; in Apple DOS it is equivalent to 256 bytes. The current versions of DOS for the II have 16 sectors in each track. Older versions of DOS placed only 13 sectors in each track.

SEEK—to have the disk drive move the read/write head to the track the Apple

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requests. In most cases, the computer then checks that the magnetic track pattern on the disk indicates that the requested track was found. If it wasn't, the Apple tries again, emitting a grinding sound—if several retries fail, the Apple reports an "I/O error."

SOFT-SECTORED—disks that keep track of where each sector of data in a track starts by using special magnetic patterns instead of by looking for punched holes around the inner or outer rings of the disk. The one timing hole marks the start of the track. Apples use soft-sectored disks.

STEPPER—the special motor that moves the read/write head on the disk drive toward the center or outside of a disk. On Apple computers, the stepper is directly controlled by the processor.

TRACK—one of the concentric magnetic patterns written on a disk during formatting. Standard Apple drives put 35 tracks on each disk, but you can buy other 5¼-inch floppy drives that use as many as 80 and hard disks with hundreds.

TRACK-TO-TRACK ACCESS TIME—the time needed for the read/write head to move from one track to the next. Shorter times mean the drive can get at data faster, especailly if it is scattered over the disk. In most cases, it is the longest part of the delay in accessing information on the disk.

WINCHESTER—a type of hard-disk drive, based on technology first used in an IBM disk drive with that code name. Winchester drives use a rigid disk and "fly" the head very close to the surface. To prevent small dirt particles from causing the head to touch the disk surface, Winchesters keep the head and disk within a closed chamber and filter the air that gets in. The Apple ProFile is a Winchester disk, as are most add-on hard disks for the Apple II.

WRITE-ENABLE NOTCH—a slot in the diskette jacket that signals the Apple that it is OK to write on that diskette. If the slot is covered, the computer considers the disk to be protected and will not write on it. Note that on 8-inch disks, the method is reversed—if the notch is open, the disk is protected.

WRITE-PROTECT—to mark a diskette so the Apple won't write or change any information on it. On Apple IIs, you cover the write-enable notch with an opaque label called a write-protect tab. On the Lisa and Macintosh, you slide a small plastic square out of the window in the corner of the disk case. +

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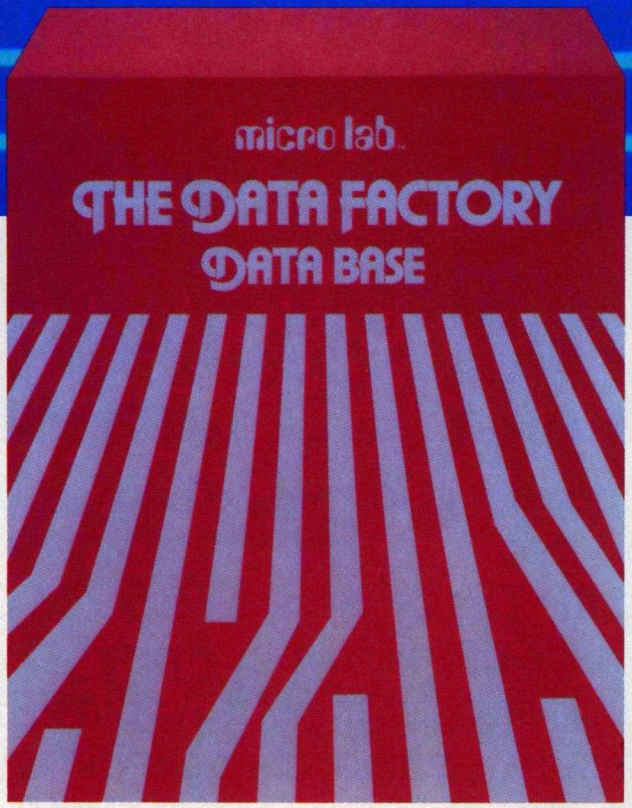

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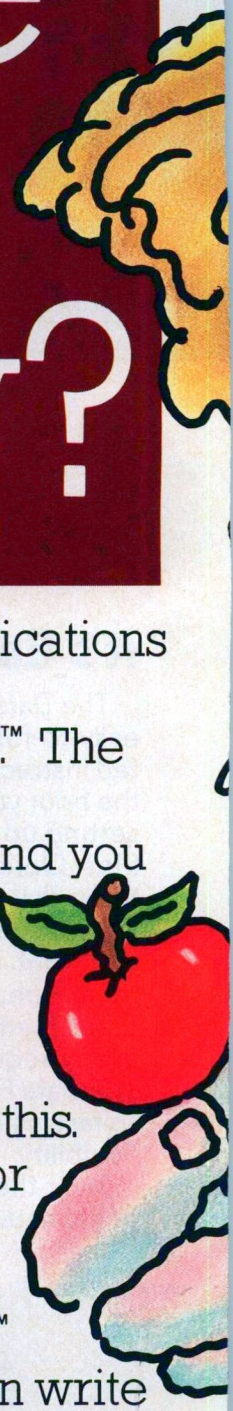

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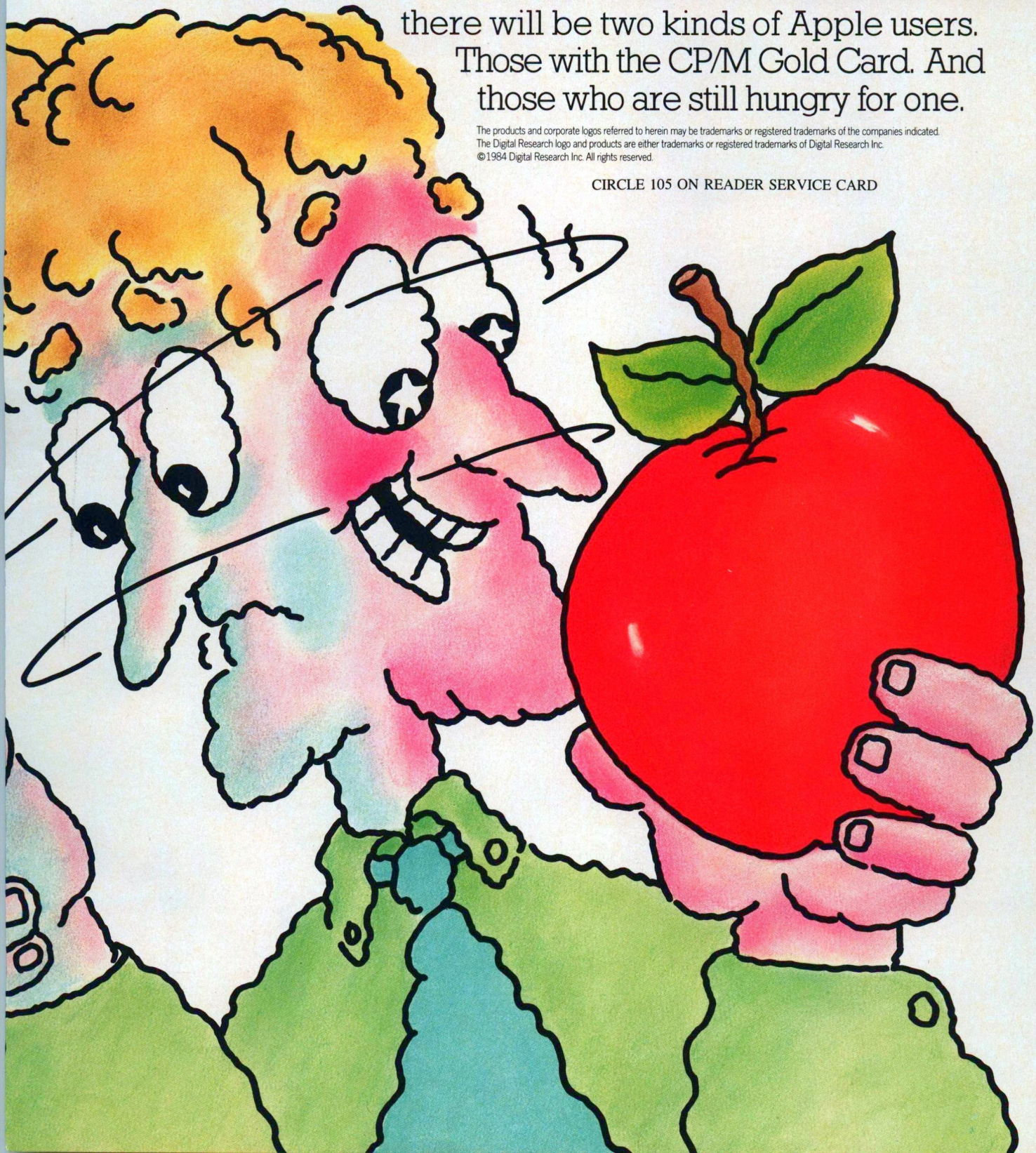

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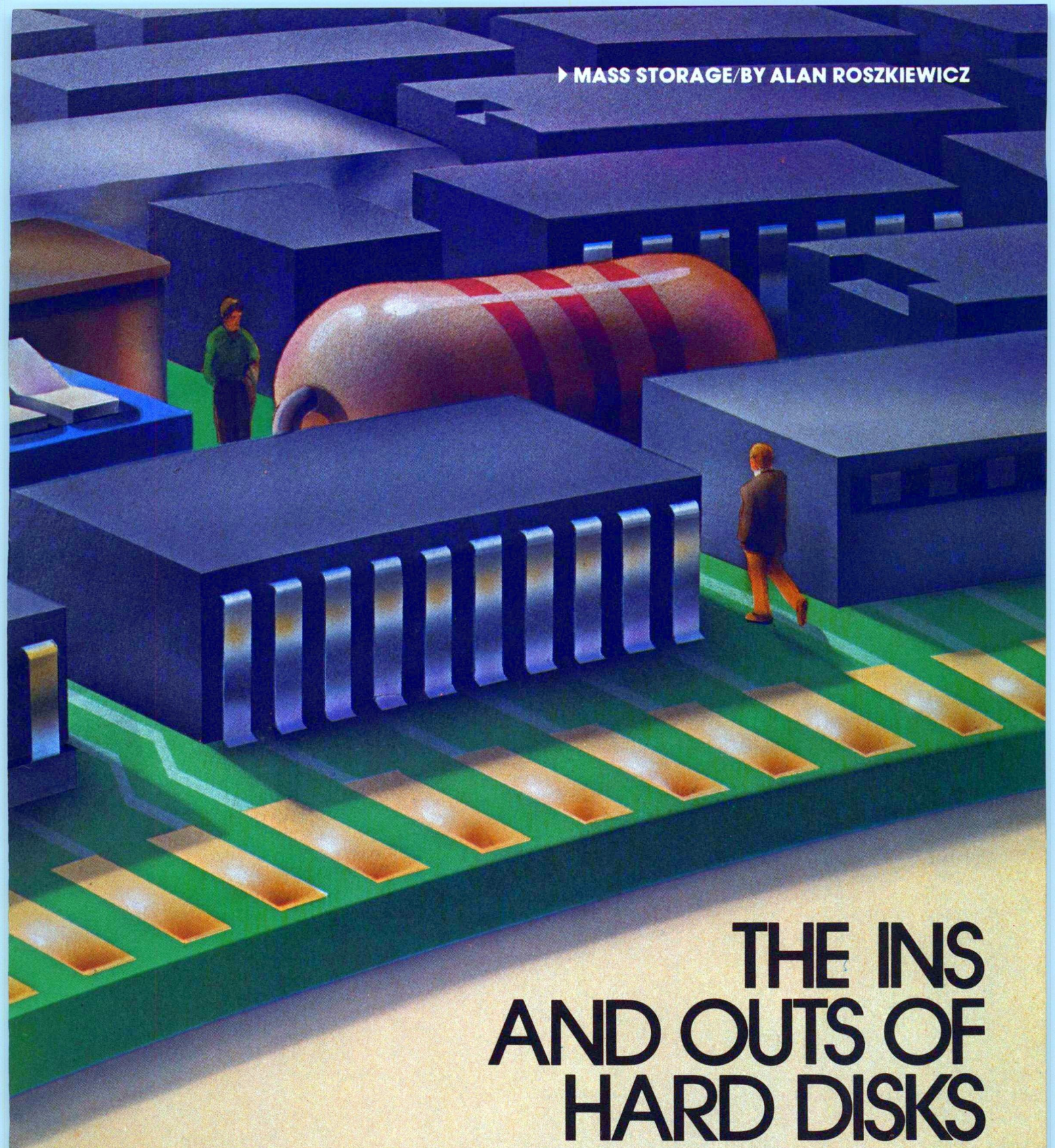


THE INS AND OUTS OF HARD DISKS

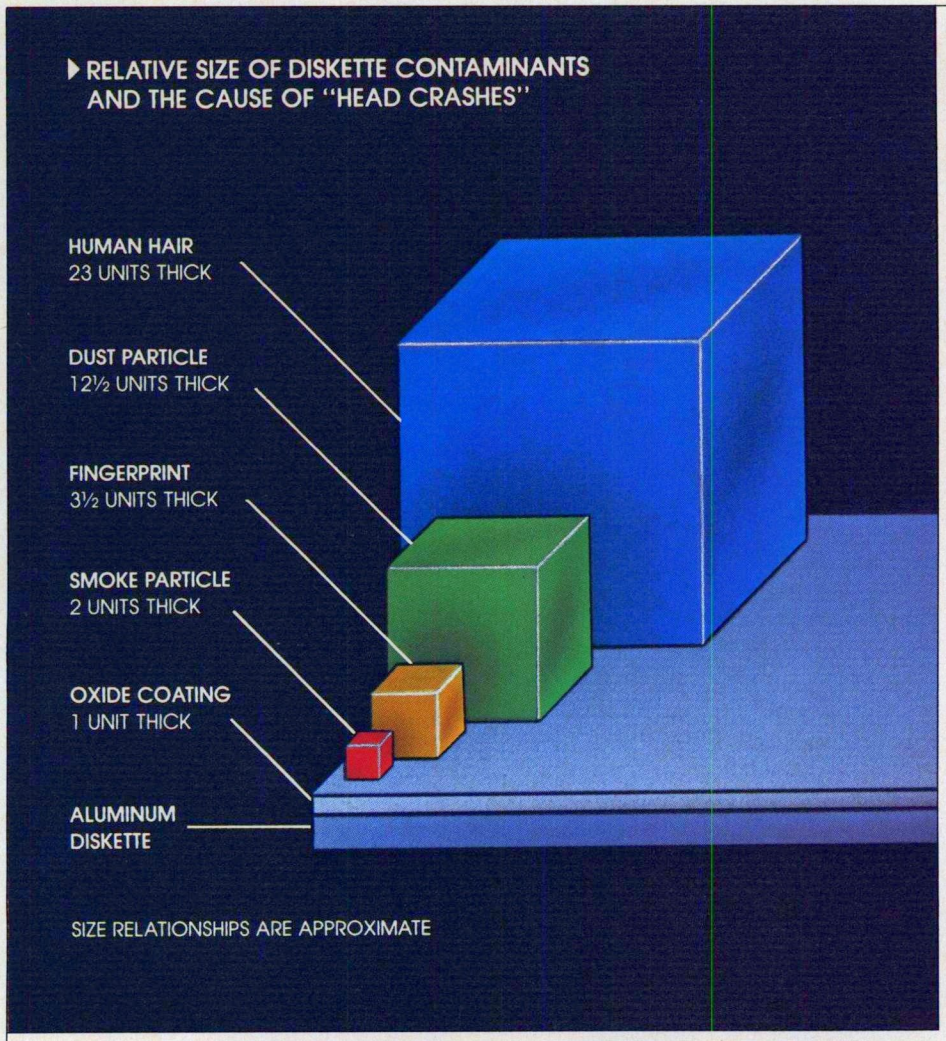
Freedom from disk-swapping may now be within your reach.

If you use your Apple for any major business applications, you may soon find yourself getting tired of swapping floppy disks all the time—for everything from assembling a database mailing list to running spreadsheet calculations.

If you've found yourself with an unmanageable collection of floppies as well as a fading love affair with your computer, then read on to hear about a powerful data-storage device available for microcomputers.

Rx for a Plethora of Diskettes

A likely solution to your storage woes may be a Winchester or hard-disk drive. These storage giants, once beyond the price range of most users, are fast becoming affordable to small-business or professional computer users. Add to this affordability the hard disk's convenience, reliability, and speed—as well as storage capacity equivalent to that of scores of on-line floppy disks—and you have the elements that make



the hard disk a viable alternative for data storage.

A Bit of Disk History

Back in the Dark Ages, before the birth of the Apple, IBM was looking for better and more convenient ways to load data into its mainframe computers.

The computer behemoth introduced both the 8-inch floppy and the 14-inch sealed hard disk around 1973. Only three years later, the floppy-disk design, pioneered by Shugart Associates, broke onto the microcomputer scene. Since then we have seen 8-inch as well as 5¼-inch floppy-disk drives, as well as the latest generation of even smaller micro-floppy drives.

Now the same technology that went into the first hard disks or Winchesters—supposedly so code-named because the original system design had a 30-megabyte fixed-disk and a 30-megabyte removable disk (30-30, as in the name of the rifle)—is reaching the consumer market. With the advent of 5¼-inch hard disks with on-line-storage capacities as large as 20 megabytes, as well as design improvements and cost reductions, the hard disk has arrived on the microcomputer scene to stay.

To give you a better idea of their capacity, a 20-megabyte system offers the equivalent of about 143 Apple 5¼-inch Disk II drives. Even if you've upgraded

HARD-DISK SUPPLIERS

Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(408) 996-1010

Automatic Resource Management
1118 East Alosta Avenue
Glendora, CA 91740
(213) 963-7213

Corona Data Systems
31324 Via Colinas, Section 110
Westlake Village, CA 91361
(800) 621-6746 or
in CA (213) 991-1144

Datamac
432 Lakeside Drive
Sunnyvale, CA 94086
(408) 720-0800

Davong Systems, Inc.
217 Humboldt Court Drive
Sunnyvale, CA 94086
(408) 734-4900

Genie Computer Corporation
31131 Via Colinas, Suite 607
Westlake Village, CA 91362
(213) 991-6210

Lobo Drives International
358 South Fairview
Goleta, CA 93117
(805) 683-1576

Micro Storage Technology
41711 Joy Road
Canton Township, MI 48187
(313) 459-3822

Mountain Computer, Inc.
300 El Pueblo Road
Scotts Valley, CA 95066
(800) 538-8157 or
in CA (408) 438-6650

Percom Data Company, Inc.
11220 Pagemill Road
Dallas, TX 75243
(214) 340-7081

Syquest Technology
47923 Warm Springs Blvd.
Fremont, CA 94538
(415) 490-7511

United Peripherals
432 Lakeside Drive
Sunnyvale, CA 94086
(408) 733-4200

Vertex Peripherals
2150 Bering Drive
San Jose, CA 95131
(408) 942-0606

Vufax, Inc.
5301 Covington Highway
Decatur, GA 30035
(404) 981-6778

XCOMP
7566 Trade Avenue
San Diego, CA 92121
(619) 271-8730

The following "big three" companies are the largest manufacturers of hard-disk drives and interfaces. You can contact them, should you require technical information for designing your own system. These companies usually only deal in quantities in the 100's, however.

Seagate Technology
360 El Pueblo Road
Scotts Valley, CA 95066
(408) 438-6550

Shugart Associates
475 Oakmead Parkway
Sunnyvale, CA 94086
(408) 733-0100

Tandon Corporation
20320 Prairie Street
Chatsworth, CA 91311
(213) 993-6644

your system to double-density, double-sided floppy disks, you can never hope to attain such power with floppies.

The Hard-Disk Difference

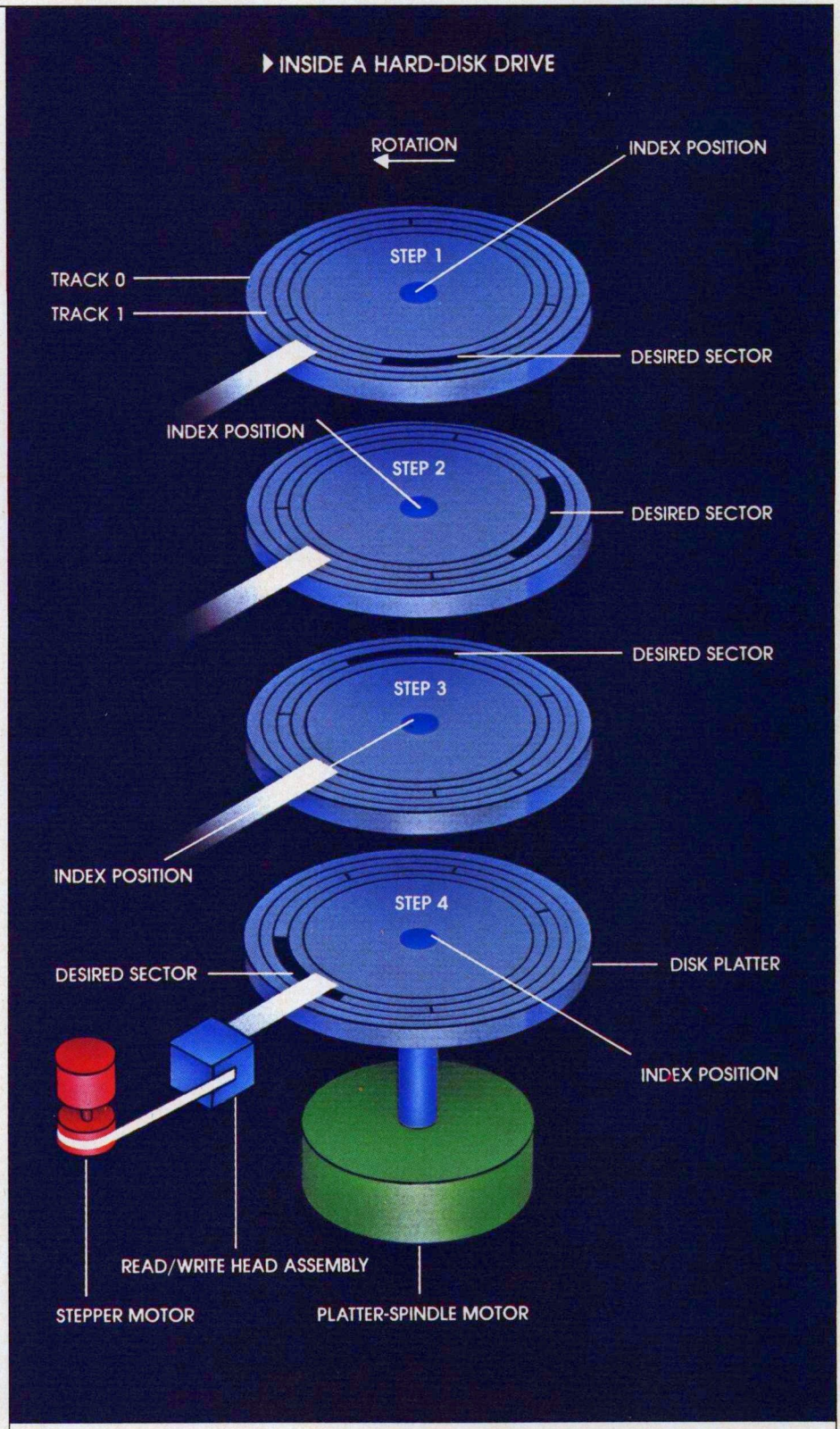
Although their technology is similar to that of floppy disks, hard disks incorporate some radical differences from their floppy cousins.

1. The disks themselves, as their name implies, are hard—they use a platter made of an aluminum alloy.

Storage media, read/write heads, and the positioning mechanism are enclosed in a sealed environment.

2. The platters have an extremely thin coating of iron oxide, which can hold a magnetic charge. Iron oxide is the main ingredient in rust, which is why the disk platters are usually a rusty-orange color.
3. The disks spin at about 3600 RPM vs. about 300 RPM for floppy-disk drives.
4. The read/write heads "fly" on a thin cushion of air the rapidly rotating disk generates. The aerodynamically designed "flying heads" never actually touch the disk surface in normal use, but rather maintain a distance of several microinches above the platter.
5. The read/write heads come to rest on a specially prepared "landing zone" when the drives aren't in action.
6. Storage media, read/write heads, and the positioning mechanism are enclosed in a sealed environment through which a filtered air supply constantly circulates.
7. Systems now come with either fixed, removable, or a combination of both types of storage media.

The theory behind hard-disk design in general is to have the read/write head flying extremely close to the disk's thin magnetic coating at a high speed. All these features of hard disks decrease the time the head needs to find information, while allowing for densities of about 300 tracks per inch, as compared to the 40 or 96 tracks per inch of the floppy drive. Since you measure seek times in milliseconds with hard disks instead of hundreds of milliseconds with floppies, and since hard disks give you data-transfer rates of up to megabytes per second, hard disks are relatively efficient in disk-intensive operations.



Keep It Clean

Because of the close mechanical tolerances involved, the storage media, drive mechanism, and heads must be protected from contaminants to prevent the disaster known as "head crash," which occurs if you bump the drive or if the flying head touches a speck of dust or other particle on the disk's surface. This hazard was a serious problem with early hard-disk technology and usually resulted in data loss and the need for expensive repairs. Fortunately, better shock absorption and filtration systems, together with sealed disk cartridges and drives that are assembled in clean rooms, have made disk crashes a rare occurrence in modern hard-disk systems.

Daddy, where do microcomputers come from?

Two informative books to teach your child about the family computer

Growing up in the computer world will be easier if your child understands computers. And there's no better place to start than with the computer that's in your home—and with the help of these two delightful books.

Katie and the Computer and *Computer Parade* read like children's story books. Yet each one actually teaches the basics of computer operation.

Katie and the Computer traces the fantastic journey that takes place after Katie falls into her family's new computer. Once inside the computer, Katie finds herself in the imaginary land of Cybernia where she meets Colonel Byte. The Colonel guides her on a funfilled journey that parallels the path of a computer command. Supplementary information helps children relate the story to the actual computer.

Computer Parade is the second book in the *Katie and the Computer* series. This time Katie and her brother arrive in Cybernia just in time for a computer parade—and to learn how computer music is made. All along their fanciful journey, the threesome encounters friendly and ferocious dragons, computer bits, eeks and aaks. And of course they're always on the lookout for program bugs.

Any youngster age 4-10 will delight in these books. They're easy to read and richly illustrated in full color.

Help your child grow up computer literate by ordering your copies now.

MAIL TODAY TO:
CREATIVE COMPUTING PRESS
Dept. ND3B, 39 East Hanover Avenue, Morris Plains, NJ 07950

Please send me_____ copies of *Katie and the Computer* at $8.95 each and *Computer Parade* at $9.95 each, plus $2.00 shipping & handling per book. Total Amount $ _____

☐ Payment Enclosed. (CA, NJ and NY State residents please add applicable sales tax.)
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(In NJ only: 201-540-0445)

What about Backup?

Depending on your applications, you will want to backup some of the data on your hard disk. You have several approaches and methods from which to choose. One way is to use floppy disks for backup of all new information after each computing session. Presuming that your program originals are already on floppies, this procedure might not be too tedious.

Some hard-disk drives incorporate a continuous tape drive to backup the entire disk, and others have combination fixed/removable drives, which not only simplify the backup process, but also provide much more data storage on multiple disks.

You should look for a hard-disk system that fulfills your projected needs, as well as your current ones.

Which System Is Right for You?

Aside from checking into Apple compatibility, you should look for a hard-disk system that fulfills your projected needs, as well as your current ones. Five megabytes may sound like plenty of space, and it is, but even this amount can fill up quickly. You should make allowances for future data needs by buying a larger size that you can grow into, much as you purchase infants' clothing a size or two too large to allow for growth. If you anticipate greatly increased storage needs in the future, perhaps one of the newer systems with removable media would be your best bet. No matter what your choice, however, you can be sure that virtually any hard disk will afford greater efficiency and increased storage capacity, compared to a floppy-disk system.

What Does the Future Hold?

Just recently, two companies, Vertex Peripherals and Seagate Technology, announced 5¼-inch and 8-inch magnetic media with storage capacities of 100 and 102.1 megabytes, respectively. This quantum leap in capacity could mean price reductions on the smaller drives, as well as availability of a new generation of higher-capacity drives in the near future. +

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At Beck, our success as a diskette manufacturer depends upon our ability to provide you with a fully reliable, quality diskette – every time. For that reason we take no shortcuts. You get the best because we are committed to excellence. Every diskette is manufactured to very strict quality standards. We test and retest 21 times throughout the manufacturing process to insure compliance with no less than 42 rigid specifications. We make sure you get the very best – a 100% certified, 100% error free diskette.

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BY CHARLIE ALLEN

THE WORLD OF DISK DRIVES

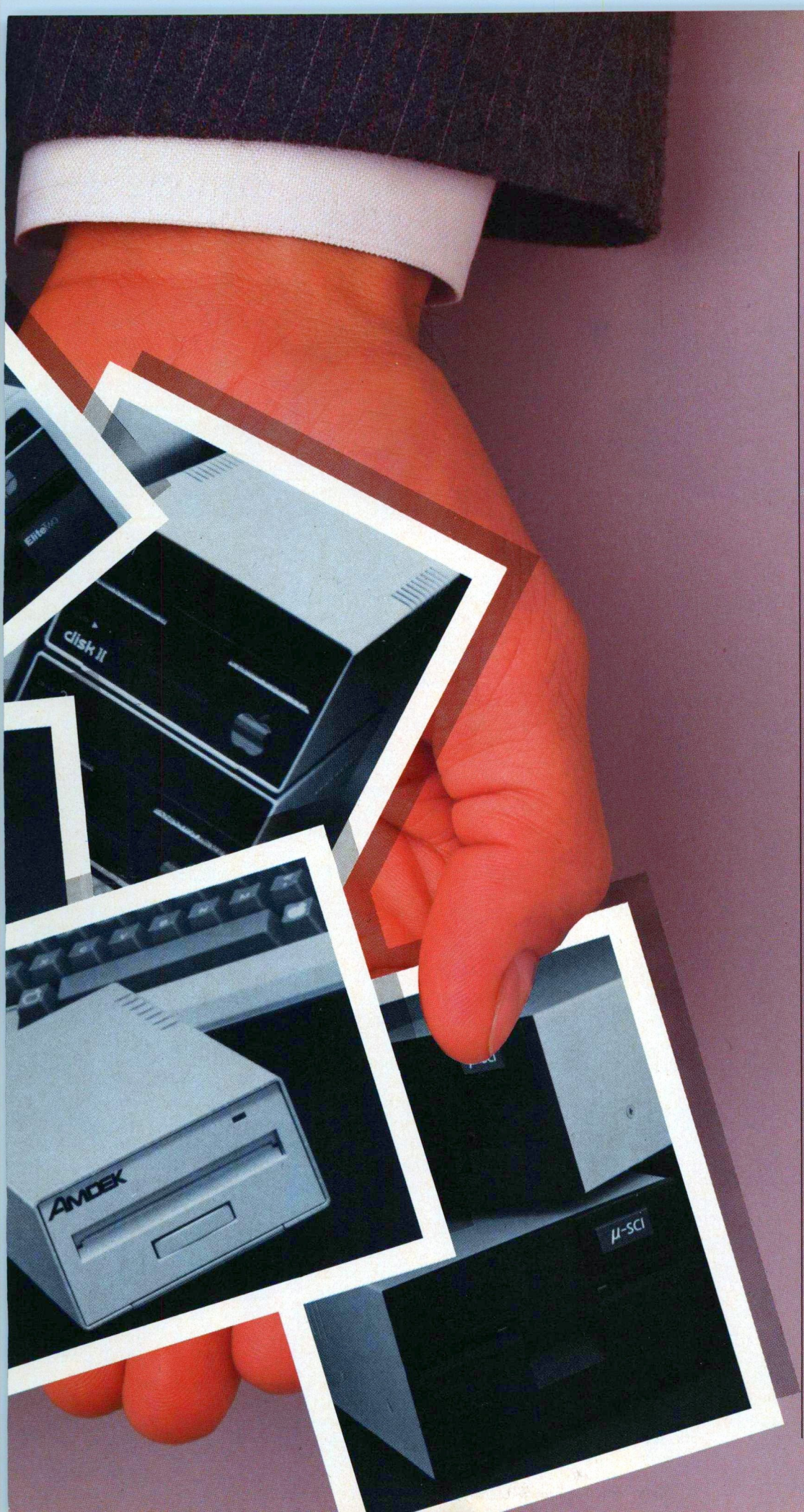
An array of choices awaits you.

Mass storage is an essential part of any computer system. The goal of this article is to provide the background you need to select the type of disk drive that best suits your requirements.

When the Apple II first came out, the choice of memory storage devices was simple: either use a tediously slow cassette tape recorder or buy a Disk II floppy-disk drive from Apple. With the increasing popularity of the Apple II family of computers, many manufacturers have developed disk-drive systems for the Apple. You now have the choice of dozens of different drives with a bewildering combination of forms, such as double-sided; double-density; half-height; micro-floppy; and 35, 40, 70, 80, 140, or 160 tracks.

THE APPLE DISK II DRIVE

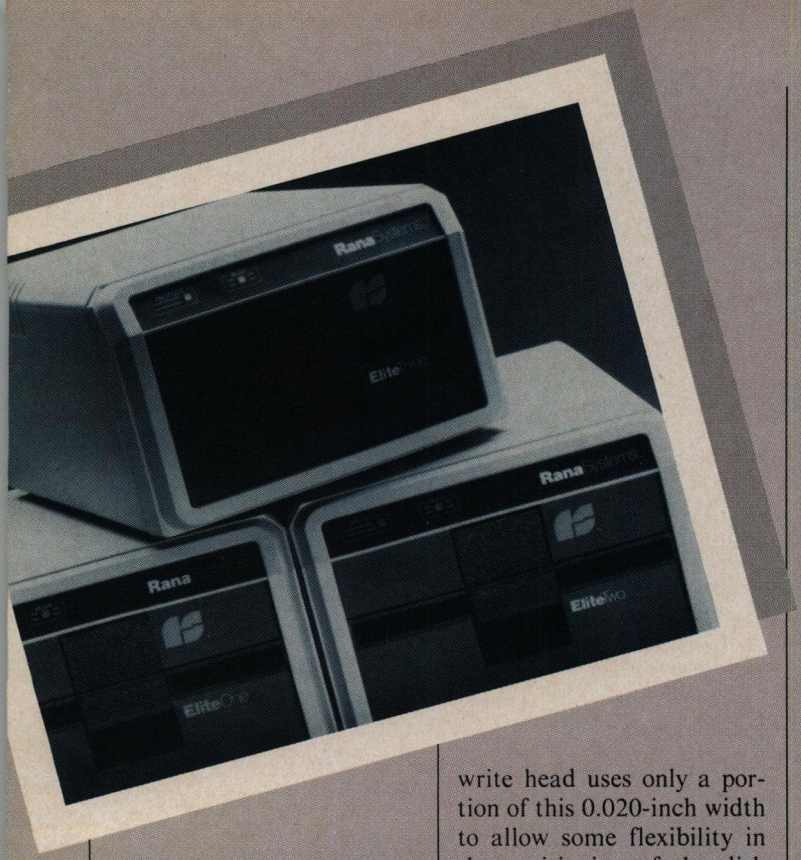
The Apple Disk II was the first 5¼-inch floppy-disk drive in wide use with microcomputers. Before the introduction of the Apple Disk II in 1978, the only way to store and retrieve data on the Apple was to use a cassette-tape recorder. Although it was an inexpensive storage device, it was very slow—the tape had to rewind and play back so you could locate information on the tape. Larger computers



of the time used 8-inch floppy-disk drives that required complex and expensive circuitry. Because it wanted to offer a less expensive, more convenient disk drive for its computers, Apple decided to design its own disk drive, using newer, smaller, 5¼-inch drives.

Steve Wozniak, cofounder of Apple and designer of the Apple II, went to work on the task. In one of the great engineering accomplishments of the decade, Wozniak designed a revolutionary new disk-drive controller, the electronic circuit necessary to operate a disk drive, during the week between Christmas and New Year's Day, 1977. Wozniak's disk controller was much less expensive, and more reliable, than anything that had been developed. Within three months of Wozniak's achievement, Apple became the world's largest producer of 5¼-inch floppy-disk drives.

The Apple Disk II drive is a storage device that uses magnetic media, as do audiotape and videocassette recorders. A floppy disk is a flat, circular platter made of Mylar or some other plastic. It is coated with a metallic oxide capable of holding a magnetic charge. The circular plate is encased in a square plastic cover to protect the sensitive surface from dust, fingerprints, and other contaminants that can destroy information on the diskette. The square cover has a large circular hole in the center to allow rotation of the diskette within the cover, and a small oblong cutout on each side that exposes the diskette's magnetic surface to the "read/write head." The cover of the diskette usually has an identification label in the upper left corner and a small notch about an inch down from the



upper right corner. This small notch is known as the "write-protect notch." When the notch is exposed, the computer can read from and write to the diskette in a normal fashion. If you place a paper tab or a piece of tape over the notch, however, the disk becomes write-protected, which means that the computer can read information from the cassette but cannot write to it. Removing the tab restores the ability to write information to the diskette.

When you place a diskette into a drive, the identification label should face up, and the notch should be to your left. If a diskette is not notched, the computer cannot write to it unless you make a notch in the proper location, using a diskette-notching device.

The Apple Disk II diskette rotates above the read/write head at 300 RPM. This head can move in or out to stop over different concentric zones or bands, called tracks. On a standard 35-track Apple Disk II drive, these tracks are about two-hundredths of an inch apart. The read/write head uses only a portion of this 0.020-inch width to allow some flexibility in the positioning of the disk between insertions in a drive and to allow for differences between drives.

The read/write head erases the full width to ensure that adjacent tracks do not interfere with each other.

The oblong hole in the diskette's cover exposes just over an inch of magnetic surface to the head. Because of its width, the head can get at less than three-quarters of that inch. Thus, with tracks spaced at 0.020 inch (48 tracks per inch), the Apple Disk II can use 35 different concentric tracks.

The three Rana drives have identical styling, with all three dimensions about half an inch larger than Apple's Disk II.

The Apple Disk II is a reliable, well-designed piece of hardware that is still useful, even though more advanced options have become available.

Now we'll discuss some of the other popular disk drives that you can use with the Apple II family of computers.

RANA ELITE SERIES

This family of drives comes in three versions: Elite I, a 35/40-track drive; Elite II, a double-sided, single-density, 80-track drive; and Elite III, a double-sided, double-density, 160-track drive. Rana also offers a four-drive disk controller and a utility package for modifying DOS to work with these above drives. A unique and useful feature of the Rana drives is the write-protect indicator/switch on the front panel of the drive. A red light-emitting diode (LED) indicates that the diskette is write-protected, and a membrane-type switch next to the LED allows you to lock the drive into the write-protect mode, even if the diskette doesn't have a write-protect tab. I find it much easier simply to press the switch than to hunt up those elusive tabs and put them on the diskette when I copy or back them up.

The three Rana drives have identical styling, with all three dimensions about

CHOOSING THE RIGHT FLOPPY

Q. What type of diskette do I need for my Apple?
A. The Apple uses a single-sided, single-density diskette.

Q. Can it also use the more expensive double-density diskette?
A. Yes, quite handily.

Q. Will double-density diskettes double the computer's storage capacity?
A. No, the storage is the same whether you use single- or double-density media.

Q. Then why pay more for double density?
A. Because you get increased reliability due to the higher-quality recording surface.

Q. Can I use both sides of a single-sided disk?
A. Probably, but you're taking a big chance with your data because the second side hasn't been tested and certified by the manufacturer. Its reliability is questionable.

Q. What do guarantees and warranties imply?
A. They imply that the disk is free from defects of material or workmanship and that you can use and reuse the disk for the specified number of years, assuming you take proper care of it. You might want to ask the salesperson whether a warranty implies that five years from now the data you have stored on that disk will still be accessible or if it means only that you'll be able to reformat and reuse the disk at that time. This distinction could make a big difference.

Q. Diskettes range in price from around $2 to $10 or $12. What criteria should I use in deciding what price to pay for my diskettes?
A. How critical is your data? How long must it retain its integrity? Warranted reliability and name recognition are the major factors separating the cheapies from the classier diskettes. If you work in an environment where temperature or humidity extremes can affect your media, you'll want to look into the new diskettes that feature sensors to alert you to dangerous conditions.

Jessie Gunn Stephens

half an inch larger than Apple's Disk II and other standard 5¼-inch drives. All three drives use the same kind of door mechanism as the Apple Disk II, where the door latch also centers the disk, engages the hub, and places the head(s) onto the disk. I find this mechanism more convenient than the spring-eject mechanisms of the Micro-Sci A82 disk drive.

The DOS configuration program that comes with the Rana drives is the best I have seen. This configuration program allows you to specify the type of drive in each of four drive positions for each disk controller (the Rana controller supports four drives); to update various utility programs on Apple's DOS 3.3 System Master diskette; and to format new disks in 35-, 40-, 80-, or 160-track formats. Rana's replacement for FID (a disk-utility program from Apple), called RFS (for Rana File Copier), adds some nice features such as the ability to support Rana's four-drive controller. It prompts you for slot and drive assignments in each command (unlike FID, where you must keep resetting the slot/drive default), and it also has an Undelete feature.

Rana includes configuration programs for CP/M and Pascal. The Rana's manual is adequate, but not comprehensive, and users should refer to the Apple DOS manual as well.

Rana Elite I

The Rana Elite is a single-sided, single-density, 40-track drive, which makes it upwardly compatible with the Apple Disk II drive. Without hardware or software modifications, DOS can use only 35 of the drive's 40 tracks, and it operates exactly like an Apple Disk II. Rana's DOS-configuration program allows use of all 40 tracks, increasing storage capacity by 20K bytes.

Rana Elite II

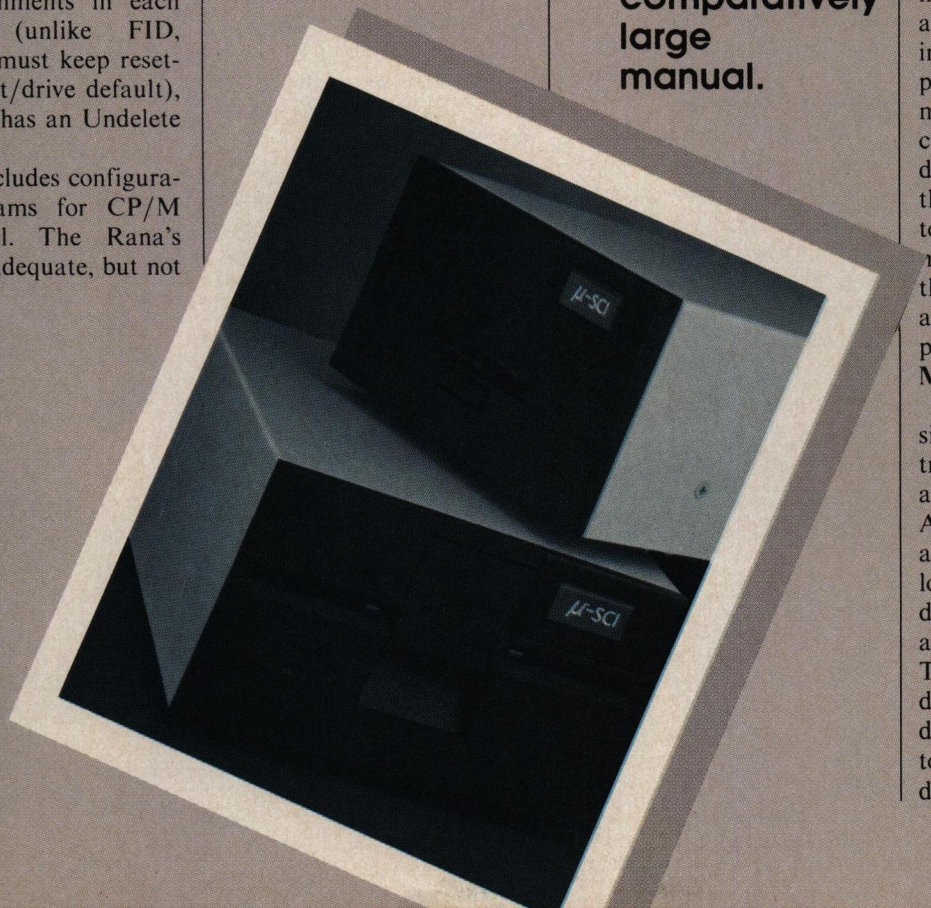
The next drive in the Rana family, the Rana Elite II, is similar to the Elite I, except that it can write to both sides of the disk and therefore has 80 tracks. Rather than call it an 80-track drive, Rana prefers to call it a double-sided 40-track drive. This designation helps distinguish it from the single-sided, double-density drives, such as the Micro-Sci A82. Since the Elite II is single-density (40 tracks per side), it can both read from and write to standard 35-track diskettes.

Rana Elite III

The Elite III is both double-sided and double-density. It has 80 tracks on each side, for a total of 160 tracks, 2560 sectors, and 655,360 bytes. Like all members of the Elite line, the Elite III has a write-protect switch and light on the front panel.

I found these elements especially helpful for protecting 35-track diskettes for use in the Elite III. Since the smaller tracks on the double-density Elite III probably have a higher bit-error rate than the tracks of the single-density Elite I, I tested the Elite III extensively. I did not get any I/O errors after running some test programs for several hours, and I have confidence that the Elite III is a reliable data-storage device.

The Micro-Sci A82 comes with both a utilities disk and a comparatively large manual.



Rana Disk Controller

The Rana disk controller can control up to four drives when you use it with a modified version of DOS. Without the modified DOS, only two drives are accessible, and DOS will give you error messages if you attempt to use drive 3 or 4. The controller comes with the same DOS configuration and utility disk that Rana ships with the Elite drives. I could find no evidence of the diagnostics mentioned on the controller's packaging, which was a disappointment.

The Rana disk controller can control the Apple Disk II drive and its clones, as well as all of the Rana Elite series drives.

MICROSCI'S DRIVES

Micro-Sci A2

The A2 Apple-compatible drive is similar to the Apple drive in size, operation, and appearance. It is a functional equivalent, with full software- and hardware-compatibility.

The A2 drive comes with little documentation: a small single-page card that tells you how to orient the connector when plugging it into the controller, the obligatory radio- and television-interference warning, and a pair of disk-drive ID tags for marking drive numbers. Micro-Sci does not provide a diskette with the drive, and the company expects users to use the Apple DOS 3.3 manual as the manual for the A2. Since the two drives are nearly identical, this approach works well.

Micro-Sci A82

Although the A82 single-sided, double-density 80-track drive is similar in appearance to the 35-track A2, it has a different door and eject mechanism. To load a disk, you push in the disk until a spring engages and holds the disk in place. Then you can close the drive's door. To remove a disk, you push an eject button located just below the door—pushing the button

releases the door, and the disk is partially ejected by a spring. Operating this type of load/unload mechanism is more difficult than operating the door/load mechanism of the Micro-Sci A2 and the Apple Disk II. One problem is that the force necessary to seat the disk and cock the spring mechanism is sometimes enough to bend the diskette. Also, unlike the other drives, this one has no recessed section in the center of the drive, making it difficult to push the disk in all the way.

The Micro-Sci A82 comes with both a utilities disk and a comparatively large manual. After the ten-page installation section, the manual goes into a 50-page rehash of the material in Apple's DOS 3.3 manual. Only after all of these preliminaries do you finally find the five to ten pages of real information that you need about the operation of the A82 and the modification of DOS, Pascal, and CP/M to work with the A82.

Then you finally get the most important warning of all: "The A82 cannot write on a 35-track diskette; to do so would render the diskette unreadable in a 35-track drive." A double-density (80-track-per-side) drive can read a single density (35- or 40-track-per-side) diskette, and at first it appears that a double-density drive can write to a single-density diskette. The problem is that although everything appears all right as long as the double-density drive is doing both the reading and writing, a 35- or 40-track drive will no longer be able to read that diskette. The data is not permanently lost, however, since you can read the data on a double-density drive and copy it back onto a new 35-track diskette.

Lest I leave the impression that the design of the A82 causes this problem, I should emphasize that this problem is inherent in the way that the double-density drives work—all manufacturers' double-density drives share this problem.

VISTA SOLO

The Vista Solo 35-track, Apple-compatible drive is similar to Apple's Disk II drive as well as Micro-Sci's A2 drive. The basic mechanism appears to be identical, as is the performance. The Vista Solo drive is both software- and hardware-compatible with the Apple Disk II drive, and you can use it with the Apple disk-controller card.

Since it is a clone of the Apple drive, Vista includes only a short installation guide, which recommends the Apple DOS manual for further information. Vista does not supply any software with the disk drive.

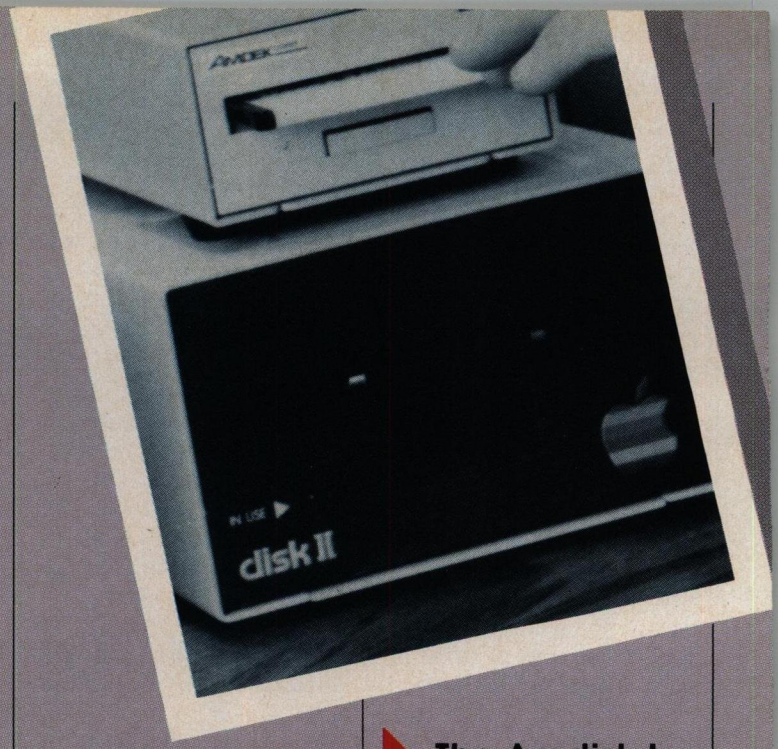
Vista also makes a controller, which is fully compatible with standard Apple hardware and works with Apple Disk II drives, Vista Solo drives, or other Apple-compatible drives such as Micro-Sci A2 drives.

In essence, the Vista Solo is fully equivalent to the Apple Disk II, except for the name on the logo and the price.

AMDEK'S AMDISK-I

The Amdisk-I drive uses a 3-inch-micro-floppy disk, which is encased in a hard cartridge measuring $3\frac{1}{4} \times 4 \times \frac{3}{16}$ inch. This cartridge has an automatic shutter mechanism that protects the magnetic surface when the disk is outside the drive. The cartridge also has built-in write-protect tabs, one for each side. You can easily set or clear write-protection with the tip of a pencil or ballpoint pen.

The Amdisk-I drive provides 143K bytes of storage in the format of the Apple Disk II (35 tracks, 16 sectors per track, 256 bytes per track). By manually flipping the cartridge, you can use the other side to get another 143K bytes. Although it uses completely different physical media, the Amdisk-I is fully software-compatible with DOS 3.3 and is directly plug-compatible with any Disk II controller. Installation simply involves plugging the drive into any standard Apple disk-controller card.



The Amdisk-I is fully software-compatible with DOS 3.3 and is directly plug-compatible with any Disk II controller.

The disk drive is a compact $4 \times 2 \times 7.5$ inches. You simply insert cartridges into a slot on the front of the drive, where a latching mechanism automatically retains the cartridge. An eject button on the front panel releases the cartridge, which a spring ejects.

The 3-inch disk cartridge is the Amdisk-I's strong point, in that the cartridge is more rugged mechanically than a normal floppy, it is smaller, and the automatic shutter offers increased pro-

DISK DRIVE STORAGE CAPACITIES

DRIVE	Density	Sides	Tracks	Sectors	Bytes
Apple Disk II	Single	1	35	560	143,360
Amdisk-I	Single	1	40	640	163,840
Micro-Sci A2	Single	1	40	640	163,840
Micro-Sci A82	Double	1	80	1280	327,680
Rana Elite I	Single	1	40	640	163,840
Rana Elite II	Single	2	80	1280	327,680
Rana Elite III	Double	2	160	2560	6,553,600
Vista Solo	Single	1	35	560	143,360

tection to the recording surface. I would not hesitate to carry an Amdisk cartridge in a shirt pocket or a purse or to throw it into a desk drawer. Since the shutter is not watertight, however, I doubt that it provides protection against spilled drinks.

The 3-inch cartridge is also the Amdisk's weak point. Three-inch cartridges are not very popular, and you will still need a 5¼-inch drive to load commercial software. Although the diskettes appear similar to the ones the Macintosh uses, they are totally incompatible. Much software is easy to copy to a cartridge, but some protected software cannot be copied, and therefore you might always need a 5¼-inch disk drive. Three-inch cartridges are also significantly more expensive than a standard 5¼-inch floppy disk.

You might consider micro-floppies if you were setting up a multi-Apple system running software distributed from a central source. One application that might be suited for micro-floppies is in a company with sales offices throughout the world that sets up an electronic-mail system using Apples and modems. In a multi-Apple system such as this, all software could be distributed on the 3-inch micro-floppy cartridges, which are easy to mail.

EVALUATION TESTING

I ran several tests on each of the drives. The tests were designed to detect errors in read/write operations or in positioning of the head to the selected track. All of the drives' error rates were so low as to be nearly undetectable, and I have developed a healthy respect for the robustness of the encoding scheme devised by Apple's engineers.

RECOMMENDATIONS

I found the Apple Disk II and all of the look-alikes to be equally satisfactory. My experience with drives is that, as with many mechanical devices, you run into an occasional lemon, even though most drives work well. Therefore, I strongly recommend that you buy drives only from someone who can provide service if you need it. ✚

PRODUCT INFORMATION

Amdisk-I
Amdex Corporation
1565 Sunflower
Costa Mesa, CA 92626
(714) 662-3949
List Price: $299 (without controller)

A2 and A82
Micro-Sci Corporation
2158 South Hathaway Street
Santa Ana, CA 92705
(714) 662-2801
List Price: A2: $345 (without controller), $445 (with controller); A82: $569 (without controller, $669 (with controller)

Elite I, II, and III
Rana Systems
21300 Superior Street
Chatsworth, CA 91311
(213) 709-5484
List Price: Elite I: $349; Elite I Plus (includes controller card): $449; Elite II: $549; Elite II Plus (includes controller card): $649; Elite III: $649; Elite III Plus (includes controller card): $749; controller card alone: $125

Vista Solo
Vista Computer Company, Inc.
1317 East Edinger Ave.
Santa Ana, CA 92707
(714) 953-0523
List Price: Solo: $299 (without controller), $379 (with controller)

Apple Disk II
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(408) 996-1010
List Price: Disk II: $395 (without controller), $545 (with controller)

TYPES OF DISK DRIVES

The following is a discussion of various forms of drives and their compatibility with the Apple Disk II:

Apple Disk II Look-alike: This kind of drive is functionally the same as the Apple Disk II. It is directly compatible in both hardware and software, and you can use it exactly as if it were a Disk II, with no software or hardware modifications.

Upwardly compatible: If you use this kind of drive without modifying to DOS, it appears to be an Apple Disk II. With modified DOS, this type of drive can access 40 tracks.

Double-density: This type of drive can read a standard 35-track disk but if you use it to write data to a 35-track disk, a standard drive won't be able to read that disk. When you use it with a modified DOS, this type of drive doubles the available storage capacity by using 80 tracks. On a double-density drive, the tracks are only half as wide (about 0.010 inch), giving you 96 tracks per inch. The head can access 70 to 80 tracks on one side of a disk. In summary, a single-density drive has either 35 (as in the case of the Disk II) or 40 tracks per side, and a double-density drive has 70 or 80 tracks per side. Since the spacing of single-density tracks is 48 to the inch, a single-density drive is sometimes called a 48 TPI (tracks per inch) drive. Similarly, a double-density drive is sometimes referred to as a 96 TPI drive.

Double-sided, single-density: This type is upwardly compatible, in that it can read from and write to standard single-sided, single-density 35-track diskettes when you use it with an unmodified DOS. With a modified DOS it can access 40 tracks on each side of the diskettes.

A double-sided drive can read and write both sides of a diskette—it uses an extra read/write head above the diskette—which doubles the number of tracks and the amount of data the drive can store. An important caveat is that you cannot use a single-sided drive to read double-sided diskettes onto which a double-sided drive has written information. Although a single-sided drive can read from and write to both sides of a diskette if you manually flip it over, flipping the diskette reverses its rotation. Thus, the single-sided drive cannot read the obverse side of a diskette that contains data written to it by a double-sided drive.

When you use a single-sided drive to write data to both sides of a double-sided diskette, you end up with a "reversible" disk, often called a "Flippy-Floppy" to distinguish it from a disk on which you write to both sides, using a double-sided drive.

Double-sided, double-density: Like the double-density drive, this drive can read a standard 35-track diskette. If you write to a 35-track diskette with a double-density drive, though, a standard drive won't be able to read that diskette.

Incompatible, but software compatible, media: This designation fits drives, such as the Amdek micro-drive floppy, that use a completely different type of diskette. Although you cannot use the diskette with a standard drive, the Amdek drive has the same format as a Disk II. You can use it with a standard DOS and plug it in to a standard Apple disk controller.

DISKS IN RAM'S CLOTHING

Solid-state floppy-disk drive emulators

Recent years have brought rapid advances in RAM-chip technology resulting in lower costs, higher memory densities, and greater reliability. These gains have resulted in many new products for consumers, among them solid-state-memory systems, or disk emulators. These devices have RAM chips formatted by software to seem just like a floppy-disk drive to the computer. They are capable of doing anything that a disk drive can normally do, and they greatly enhance operating speeds. Other advantages are reliability and decreased mechanical and media wear.

Faster and more reliable than floppy-disk drives, RAM disks have faced two major obstacles that have slowed their acceptance. The first is the volatile nature of RAM, which loses the contents of memory if you lose power. Using low-power CMOS memory with battery backup is a way of eliminating this problem—this solution becomes more attractive as CMOS prices drop. The second problem is the high cost of these newer high-capacity chips. Price will become less of an issue, however, as costs fall and availability increases. For example, the Axlon Ramdisk 320, which retailed for $1395 as recently as the middle of 1983, was selling for $999 by the beginning of 1984.

What follows is a review of two RAMdisks that represent two different approaches to the design of these products. The first, Synetix's Flashcard, incorporates RAM on a peripheral card that you install in one of the Apple's expansion slots. The other, Axlon's Ramdisk 320, is an external unit about the size of a standard 5¼-inch disk drive, which connects to the Apple via a ribbon cable and interface card and features battery backup. Expect to see other similar products as more manufacturers jump on the bandwagon—they are likely to make use of one of these two approaches.

FLASHCARD DISK EMULATOR

The Flashcard from Synetix, Inc., is a peripheral card that fits inside one of the Apple II's expansion slots. Once installed, the Flashcard emulates one or two standard floppy-disk drives, depending on the model.

Model 2201, which provides 147K of RAM and emulates one disk drive, has 16 64K RAM chips in its 32 I.C. sockets. Adding 16 more RAM chips upgrades the Flashcard to the 294K Model 2202, which emulates two drives. Both models use the same owners' manual and software.

Installing the card is simply a matter of turning off your Apple's power, taking off the cover, and inserting the Flashcard in any available slot. The manufacturer recommends use of slot 5 for a single-unit system and slot 4 for a second Flashcard. The reason for these slot assignments is to provide compatibility with CP/M and Pascal, which both expect additional memory to be located in these slots.

Synetix's Flashcard incorporates RAM on a peripheral card.

The Flashcard comes with three disks that have the disk-emulation software, or drivers, you need to use it with DOS, CP/M, or Pascal. You boot the appropriate disk to configure the Flashcard for your system.

To install the Flashcard driver, you simply select options from the Displayed menus. As with a normal floppy disk, you have to initialize the Flashcard, which you can do with the usual INIT command or with a Copy program that does its own formatting.

The Apple treats the Flashcard as a normal disk drive. All standard DOS commands operate in their usual manner, with one major difference: operations that involve data transfer with a disk take only a fraction of the usual time. When you press the Return key after a Catalog command, your screen will instantaneously fill with information. A similar process with a mechanical drive would take several times longer. Most disk I/O operations benefit from speed increases of 100 to 500% (see table).

Since all data disappears from the Flashcard's memory when you shut the system off, you have to transfer to a standard floppy disk all files that you want to save. The people at Synetix tell me that an on-board battery backup may be designed into a future model to prevent accidental erasure of data by brief power failures.

RAMDISK 320

Axlon's Ramdisk 320 is also a solid-state-memory system like the Flashcard, but it is notably different. It is an external unit, with its own power supply and backup battery, that connects to an Apple expansion slot via a cable and interface card. The main memory unit resides in a solid metal box the size and color of an Apple Disk II drive, weighing in at eight pounds. Inside this box is a matrix of 40 64K RAM chips that provides 320K bytes (327,680 bytes) of virtually instant memory. This unit also contains the main power supply, which provides filtered power to operate the main memory and the interface card. It also trickle-charges the enclosed battery, which can maintain memory for up to three hours in the event of a power outage.

This box of "powered chips" connects to the Apple's bus via a ribbon cable and interface card. The interface card, which installs in either slot 4 or 5, draws power from the Ramdisk unit. Since some of the card's circuitry is live at all times, handling it while it is connected to the main system requires particular care. Four rubber feet on the card and a passing mention in the man-

ual of the hazards of this situation are the only effort the manufacturer has made to protect users. A good practice is to disconnect the cable from the interface card before removing it from or installing it in the Apple.

Thanks to a concise installation-guide section in the manual, the procedure takes less than ten minutes. The interface card goes in either slot 4 or 5 of an Apple—the power has to be off. The cable from the main memory unit connects to this card. Plugging the main memory unit into the AC power line with its attached power cord and switching it on completes the hardware installation. You then turn your Apple on and boot your standard DOS 3.3. After booting DOS you run the programs on the DOS System Master Disk from Axlon, which contains programs that configure the Ramdisk as one or two additional disk drives.

The Ramdisk's RAM works like the Apple's disk memory, except that Apple disk drives divide the diskette into 35 tracks with 16 sectors of 256 bytes each, for a total of 143,680 bytes of storage, and the Ramdisk divides its memory into 40 tracks of 16 sectors each, for a total of 163,840 bytes of memory.

Typically you format the memory as drives 1 and 2 of slot 4. The Option program then modifies your DOS diskette to activate the Ramdisk. Subsequently, every time you turn the system on or boot it, the entire contents of mechanical drive 1 are copied onto the Ramdisk's drive 1. You can then choose between formatting the Ramdisk's drive 2 or preserving any data from previous sessions.

The Ramdisk's RAM works like the Apple's disk memory.

The Ramdisk 320 operates in either its Battery mode or in one of three AC-power modes. When the unit is in use in the Full Access mode—i.e., when it's activated in the Apple's bus—it uses 30–32 watts of power. In the Memory Refresh mode, in which the system indefinitely maintains previously stored data, the unit draws 20–22 watts. A plugged-in unit with its power switch off still draws 5–10 watts to keep the power supply active—remember the live interface board—and the battery fully charged. The final operating mode is Battery Backup, which switches on in the event of an AC-power interruption while the unit is in the Full Access or Memory mode, providing power to maintain memory for up to three hours.

Like the Flashcard, the Ramdisk comes with the necessary drivers and installation, copy, and formatting programs to allow operation with DOS 3.3, CP/M, or Pascal. The RDCOPY program can copy an entire disk from a mechanical drive to the Ramdisk, or vice versa.

Using the Extra40 program lets you take advantage of the additional 20K bytes of memory you get on each drive when you're in a DOS system. The Ramdisk gives you this extra memory because it has 40 tracks of memory, instead of the Apple's 35 tracks. This utility is not necessary for CP/M, which sees the Ramdisk as drives C and D (40 tracks each) or as a single 320K byte C drive.

The DOS System Master includes two useful utility programs that show you how to use the Ramdisk to its full potential. The first is a data-management program called Directory, which can store, sort, and retrieve more than 3200 records at lightning-fast speeds. It finds any record in about two seconds.

The other program, Mini-Base Phone Book, provides features such as report generation and access to up to five files, with 200 records of up to six fields each per file.

Both products performed as advertised without a hitch. These devices are a real convenience, and the time savings for disk operations are substantial. I'm somewhat prejudiced towards the Axlon product, finding a little extra assurance in the battery backup. Also, the Ramdisk produces less heat inside the Apple's case. I encountered no problems with either product, though, and my preference may be an unfounded fear of memory loss. The offer of onboard battery backup on a future Flashcard model will eliminaate the edge I feel that the Axlon system has.

Axlon is considering selling the Ramdisk 320 with fewer chips to lower costs and to give you the option of adding a full complement of chips later. The company also offers the new Axlon #5MB, which is a 5-megabyte RAM disk compatible with the Axlon 320.

As the new 256K bit RAM chips become available, they should not only help to lower 64K RAM prices but should also open the door to even larger systems. +

▸ RAM CHIPS IN APPLES

Early Apples used 16K bit RAM chips to provide the computer's working-memory area. Since memory costs were high, these Apples often came with a partial complement of memory chips. Users could add more memory by installing banks of eight chips until the motherboard held its full complement of 24 16K RAM chips—48K bytes of user RAM. To get a 64K machine, you had to install a language or memory card, also populated with these 16K chips, into slot 0. The newer Apple IIe's use advanced 64K bit memory chips, only eight of which on the motherboard give you a 64K byte machine.

▸ PRODUCT INFORMATION

Flashcard Solid State Disk Emulator
Synetix, Inc.
15050 N.E. 95th Street
Redmond, WA 98052
(206) 828-4884

List Price: Model 2201 (147K) $349, Model 2202 (294K) $529

Requires: Apple II, II Plus, or IIe

Ramdisk 320K Memory System
Axlon, Inc.
170 North Wolfe Road
Sunnyvale, CA 94086
(408) 730-0216

List Price: $999

Requires: Apple II, II Plus, or IIe

▸ EXECUTION SPEEDS

Program	APPROXIMATE TIME (SECONDS) Solid-State Drive	Apple Disk II
DOS Boot (Language Card load)	1	14
Com-Ware (communications)	6	34
WriteAway (word processor)	6	25
Catalog	instantly	3–6
Text files (up to 28K)	1–3	5–20

Comparison of execution speeds of Apple Disk II and solid-state drives

A DANIELS

▶ MASS STORAGE/BY STEVEN MARKS

ACCELERATING YOUR APPLE

The right peripherals can do the job.

The Apple II is a reliable and versatile computer. Even though the computer's 6502 microprocessor can execute about 500,000 instructions every second, some people would like their Apple to go a bit faster. This article describes three ways to speed up the performance of your Apple II: (1) using an electronic RAM disk in place of a floppy-disk drive, (2) using a printer buffer to speed up the printing process, and (3) using a faster version of the 6502 processor.

Turbocharging an Apple

The speed of the computer is important in most applications. Unfortunately, informal discussions of computer speed usually take into account only the gross speed of the whole system. When engineers talk about the speed of a computer system, they are usually referring to one of two different speeds, the speed of the processor or the speed of the input/output (I/O) system. The type of speed increase that will be most beneficial depends on the intended application.

When most people talk of computer speed, they are generally talking about how quickly the microprocessor executes commands, such as adding two numbers together or centering a line in a word-processing program. Microprocessors have fixed operating speeds.

Of primary importance in any consideration of I/O speed is the data-transfer rate to and from the disk drive. Since most applications access the disk frequently, the speed of the disk drive is usually more of a limiting factor than is the speed with which the computer can act on the information.

Lumping together microprocessor and disk speed is deceiving, since you need to distinguish which factor might be causing a performance bottleneck. A task that is heavily disk-intensive will realize little gain from an increase in the speed of the microprocessor, even though the computation speed would be faster. Understanding the nature of the task we want to speed up provides the clues we need to get the Apple up to warp speed.

Speedy Disks

Since disk drives are mechanical devices, their speed is limited compared to that of the electronic components of a system. The read/write head of the drive must physically move from one track to another to read or write information. Apple's Disk II drives have a further disadvantage because of their design.

If you've had experience using other computer systems, you know the Disk

II is a comparatively slow drive, mainly because it was one of the first 5¼-inch drives ever produced. Hard-disk drives are much faster than floppy drives, but they are also mechanical devices and therefore take time moving the head from track to track, reading and writing data. By using disks that are not mechanical, you can realize a great speed increase.

When you catalog a disk, using a RAM disk, you can't even get your finger off the Return key before the catalog appears.

A solution to the speed limitations of disk drives has been available for several years: The RAM disk involves RAM chips, the same chips that are used for memory inside of the computer.

You place the RAM chips on a plug-in board and configure them to function as a disk drive. All you need is a program that tricks the computer into thinking the RAM is actually a physical disk drive. Since the RAM disk has no moving parts, it greatly increases response time.

How fast is it? Manufacturers claim speed increases of 10 to 20 times the disk-drive speed. In actual use this speed increase translates into virtually instant response. When you catalog a disk, using a RAM disk, you can't even get your finger off the Return key before the catalog appears. Once I'd tried a RAM disk, I knew I couldn't live without one. You actually have to use one to believe the speed.

RAM disks, also called "solid-state disks," "electronic disks," or "pseudo disks," get the Apple to respond like a well-oiled machine. If you have ever spent time working on a large program, you know how long it takes to continually load, modify, and save a file. The process seems to take forever when you are anxious to see if your latest changes were successful. The RAM disk removes delays, allowing you to concentrate on the task at hand.

Spreadsheet users will also find RAM disks beneficial. Spreadsheets are notoriously hungry for memory. Many RAM disk cards come with special software for use with VisiCalc and other spreadsheet programs, which allows the use of the RAM on the card for holding large spreadsheets.

Several popular plug-in RAM-disk boards are available for the Apple. The most common sizes are 128K and 256K. If you need them, and your pocketbook can stand the shock, you can use several RAM disks together, each acting as a separate drive. If you use CP/M or Pascal, you should make sure the RAM card you are interested in comes with software for use with those operating systems. Reviews of three of the popular RAM boards, from Legend, Titan, and Omega, appeared in Volume 1, Number 2 of *A+*.

RAM disks are not inexpensive. A 256K pseudodisk usually lists for about $795. 128K versions sell for about $499—a big investment if you are not sure the speed advantage is worth it. You can get a taste of RAM-disk speed without the big investment, however. Precision Software in Milwaukee, Wisconsin, sells a program that turns the additional 64K in an Apple IIe extended 80-column card into a RAM disk. So far, the company's only version is for running programs under Apple DOS and Pascal, but CP/M support is in the offing.

If you don't own an extended 80-column card, don't despair. Several programs turn the upper 16K of any 64K Apple into a small pseudodisk. Although 16K doesn't give you much space to work with, it can give you an idea of what a RAM disk is like before you make an investment. Check with your local users' group for a copy.

The capacity of 128K RAM disks is a bit smaller than that of an Apple Disk II drive, which has a capacity of 143K. The closeness of size raises interesting possibilities.

If you delete the DOS tracks (which the pseudodisk cannot use) and some of the unused catalog space, then the capacity of the RAM disk would be the same as the Disk II's. To my knowledge, no one has written a program yet to take advantage of this size correspondence.

A second function RAM disks can serve—with appropriate software—is to speed up routine disk copying. If your RAM disk is large enough, you can write an entire disk to the RAM card in a single pass and then write to the destination disk in a second pass. Copying an entire disk in this manner takes less than 30 seconds. The greatest advantage is to owners of single-drive computers, who have to suffer through multiple disk changes to copy a disk.

The Best-Laid Plans

Now for the bad news: copy protection. Copy protection is the scourge of the Apple world. Since you cannot transfer a copy-protected program by normal means, you cannot move it to the RAM disk. The RAM disk is useful only for unprotected programs.

A second limitation involves programs that direct disk access to slot 6. After you transfer the program to the RAM disk and attempt to run it, it may still try to find a disk in one of the floppy drives.

Since many Apple DOS programs are copy-protected, the copy-protection limitation makes the RAM disk most useful for CP/M programs, which are not usually copy-protected. Placing WordStar, for instance, in the RAM disk makes the program run much faster than usual.

A final word of warning about using RAM disks: since they are not real, physical disks that offer permanent storage, you have to copy data back to a floppy disk before turning off the computer. If you don't, the program, along with any changes, will disappear. Most users that have had such an experience are not likely to repeat it.

The Two-Headed Apple

More often than not, the printer is the element that slows down a system the most. We can do little but wait while the printer is printing. Ceilings, carpets, and even dust particles floating in the air take on an unusual fascination when we wait for the printer to finish. If the computer did not have to wait while the printer worked, it would be free for other tasks.

If you need them, and your pocketbook can stand the shock, you can use several RAM disks together, each acting as a separate drive.

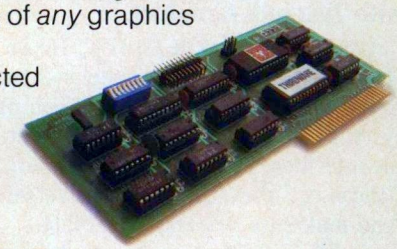
Freeing the computer from waiting for the slower printer is exactly the function a print buffer serves. The print buffer is an area of RAM between the computer and printer. It works like a bucket with a small hole in the bottom.

SEIZE CONTROL.

Add a *smart* Print Screen Key to your Apple.

FingerPrint™ is the parallel printer interface card that puts Apple in the palm of your hand. But that's only the beginning. A touch of the FingerPrint button puts any program on hold, so you can make hard copies of *any* graphics or text. And do things Apple never imagined.

FingerPrint consists of the printer interface card connected to a touch-sensitive button that adheres to your keyboard. It also comes with a free printer cable and a disk loaded with programs. Now with VisiCalc enhancements.



We made FingerPrint smart. You can make it even smarter. The built-in ROM provides functions like **Print Screen, Program Pause, Graphic Dump, Jump to Keyboard or Monitor for De-bugging** and more. With 2K of user RAM, you can invent new functions such as **Keyword Search and Replace** or special tasks only you could dream up.

FingerPrint works with any parallel printer made. And it can be programmed to interface with new printers as they come on the market.

Get the most out of your Apple II, Apple II+ or Apple IIe. Order FingerPrint today. Or visit your nearest dealer for a test flight.

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A

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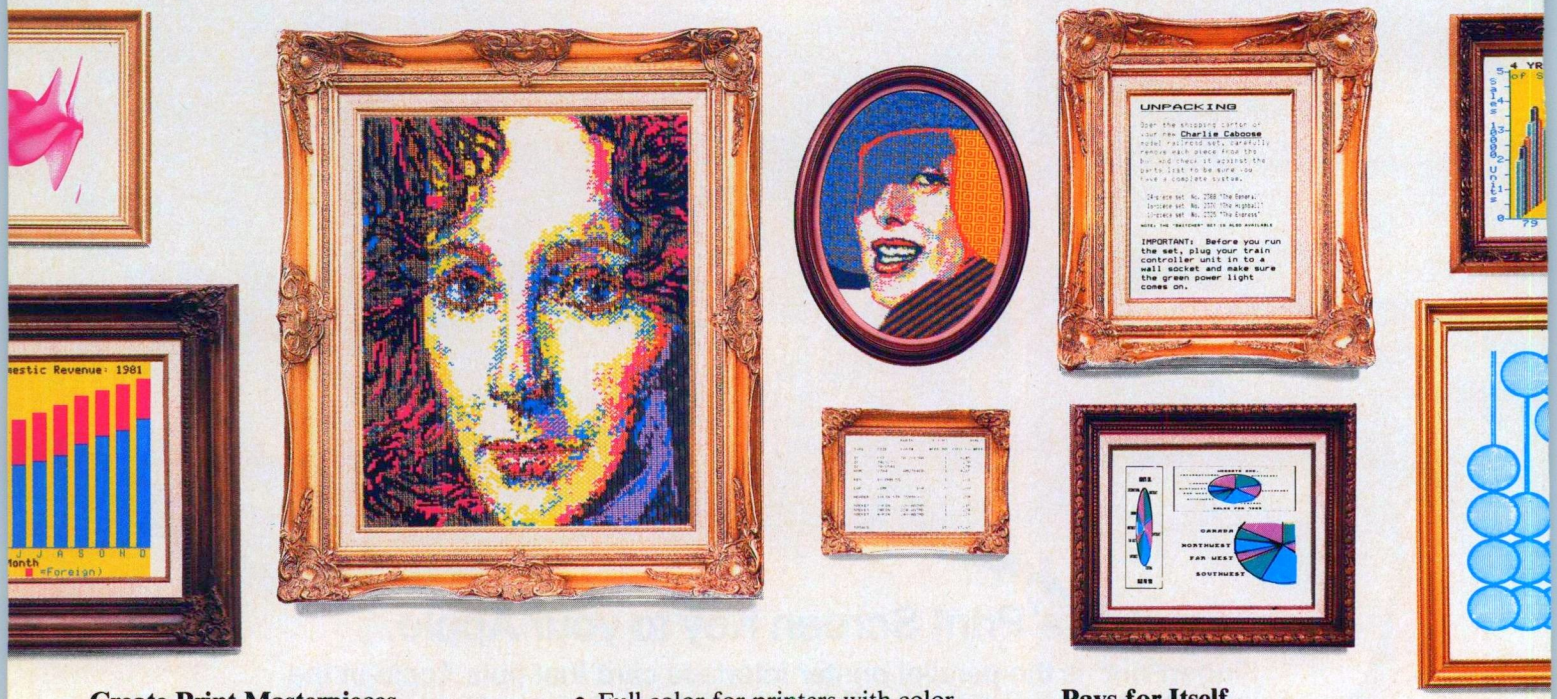
CIRCLE 103 ON READER SERVICE CARD

DID PICASSO DO IT?



Create Print Masterpieces with Text and Graphics.

Upgrade the Apple II, II+, IIe or III computer and any parallel printer to a complete text and graphics output system with the newest and most versatile interface, PKASO/U. (Pronounced "Picasso," the "U" is for Universal). And make use of every capability available from the printer. And gain additional text and graphics features to turn every printout into a masterpiece.

Get Greater Visual Range and Instant Screen Printouts.

Gain every state-of-the-art printing capability, including exclusive features not offered by any other interface:

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- Print the graphics screen *any* size — from inches to feet — another PKASO/U exclusive.
- Instantaneous, single-command Lo Resolution Screen Snapshots, only from PKASO/U.
- Super Resolution — higher resolution graphics from your dot matrix printer than possible on the screen, only from PKASO/U.
- 4-way Rotation of image — 90°, 180°, 270°, 360° — positioned anywhere on the page.
- Direct or Reverse Printing — black on white or white on black.
- Full color for printers with color capability.
- 16-level gray scale for black and white photographic images, only from PKASO/U.
- Aspecting, with separate width and height adjustments for any size and aspect ratio.
- Windowing, the printout of any selected portion of a graphics image in any size — equal, enlarged or reduced, another PKASO/U exclusive.
- Low-cost clock/calendar option for time/date stamping, available soon.

Get Universal Compatibility with Current/Future Technology.

Link the Apple computer with any and all major parallel printers of today or tomorrow. Unlike other printing interfaces which are limited by ROMs or DIP switches with pre-set configurations, PKASO/U is completely configurable for either present or yet-to-come Centronics parallel-interfaced printers. Another only-from-PKASO/U feature.

Add ShuffleBuffer for a Complete Upgrade.

The new Buffer with a Brain, ShuffleBuffer, does the printer-feeding work of the Apple so the computer is free to perform other tasks. It's the only buffer that can rearrange stored data, mix and merge, repeat and reprint. Ask your dealer for a demonstration.

Pays for Itself with Color Ribbon Savings.

Exclusive Mosaic Mode suspends color dot overprinting operation, uses color dots printed next to each other (not on top of each other) to achieve the desired shade. And since fewer dots are printed, less ink is used, ribbon life is doubled and the PKASO/U pays for itself in ribbons saved.

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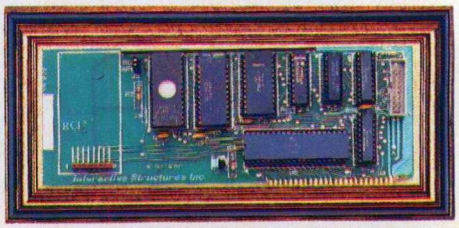
A fully-documented Demonstration Diskette and detailed User Manual make it easy; just plug in the cables (included) and start producing masterpieces. Explore the amazing capabilities of PKASO/U by visiting a nearby computer peripherals dealer. Or call us directly at (215) 667-1713 and we'll send you the details. Unframed.



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Interactive Structures, Inc.
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Bala Cynwyd, PA 19004
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CIRCLE 274 ON READER SERVICE CARD

The computer quickly fills up the buffer with data and trickles it into the printer at a rate the printer can accept. The computer refills the buffer, then waits for it to drain, and then fills it up again as long as you have data to print. Between fillings the computer is available to do other tasks.

One popular printer buffer is the Microfazer from Quadram in Norcross, Georgia. The Microfazer is a stand-alone unit that comes in buffer sizes ranging from 64K to 512K. The 512K buffer is big enough to hold about 250 typewritten pages.

If we were working with a word processor and wanted to print a file, we could start the printing, sending the file to the buffer, where it would wait for the printer to accept it. Once you send the file, the computer is freed from the printing process and ready for more work.

In addition to this basic function, print-buffer packages often offer several other nice features. For little more than the price of a printer interface, you can get a 64K print buffer and the interface on a single card. Since you need an interface card to connect the printer to the Apple anyway, this is a real bargain, and you should consider it if you do any substantial printing. MicroTek in San Diego, California, offers a package called Dumpling-64 that includes a parallel interface, a 64K print buffer, and a program that compresses data in order to allow a total of 250K of print buffering.

Another feature common to print buffers is a copy button. After you send data to the buffer, the printer can make multiple copies of the material in the buffer, while the computer is free to work on another task.

New, "smart" print buffers that are just coming to market take over more of the computer's functions. A microprocessor integrated into the buffer gives you extra control of printing. The ShuffleBuffer from Interactive Structures in Bala Cynwyd, Pennsylvania, allows you to interrupt long print jobs to do short jobs, using a process called bypass printing. The ShuffleBuffer is even smart enough to count the number of copies you want made without the computer's help. You can move paragraphs around in the buffer and merge information into documents that are already in the buffer.

Interactive Structures claims that the ShuffleBuffer can "merge-print" 1500 letters in less than 60 seconds of actual computer time. That claim is pretty impressive for a print job that would normally tie up both computer and printer for 22 hours.

If you spend most of your time printing, then a print buffer should be high on your list of add-ons.

Accelerated Computing

The speed of data movement (I/O) is only half the battle in creating a speed-demon computer. Once you load data into the computer, the computer's processor takes over and executes the program. Here is where the actual computing takes place. The type of processing differs, depending on the type of program. A database may sort items alphabetically, a word processor may justify text, and a graphics program may draw a picture when you run the program. In each of these cases, the computer must do some "thinking" to execute the command. The time the task takes is related to the speed of the microprocessor in the computer.

For little more than the price of a printer interface, you can get a 64K print buffer and the interface on a single card.

Although the Apple can execute more than 500,000 instructions per second, it is not known for having a very fast processor. Its computational speed is slower than that of many other microprocessors available these days. If your programs require a lot of computation—often called "number-crunching"—you may need a faster processor. The faster the processor operates, the faster the program will run. Boards called "accelerators" give the Apple faster processing speed.

An accelerator card, an auxiliary processor for the Apple, usually has the same type of microprocessor as the Apple, a 6502, but the microprocessor on the accelerator runs at a faster speed than that of the similar chip on the Apple. (See "Accelerator II," Volume 2, Issue 3.)

SpeeDemon from McT of Santa Monica, California, is one of the lower-priced accelerator cards for the Apple at $295. The card, since the processor is still a 6502, runs all Applesoft, Apple FORTRAN, Pascal, and VisiCalc programs. Virtually any program can run with these cards, copy-protected or not. And run they will, a whopping 3½ times faster than normal. This speed increase is phenomenal, but the perceived increase is even greater. Programs seem to run about six times faster than usual with the card.

Start Your Engines

If your taste runs to Ferraris, the combination of a RAM disk and accelerator card is hard to pass up. Imagine the pleasure of instant response to your commands, the sound of your Apple revving up in the pits. The joy of a speeded-up Apple is the sheer pleasure of incredible performance. So next time people say your Apple is slow, challenge them to a race. +

▶ LIST OF MANUFACTURERS

Interactive Structures
146 Montgomery Avenue
Bala Cynwyd, PA 19004
(215) 667-1713

Legend Industries, Ltd.
2220 Scott Lake Road
Pontiac, MI 48054
(313) 674-0953

McT
1745 21st Street
Santa Monica, CA 90404
(213) 829-3641

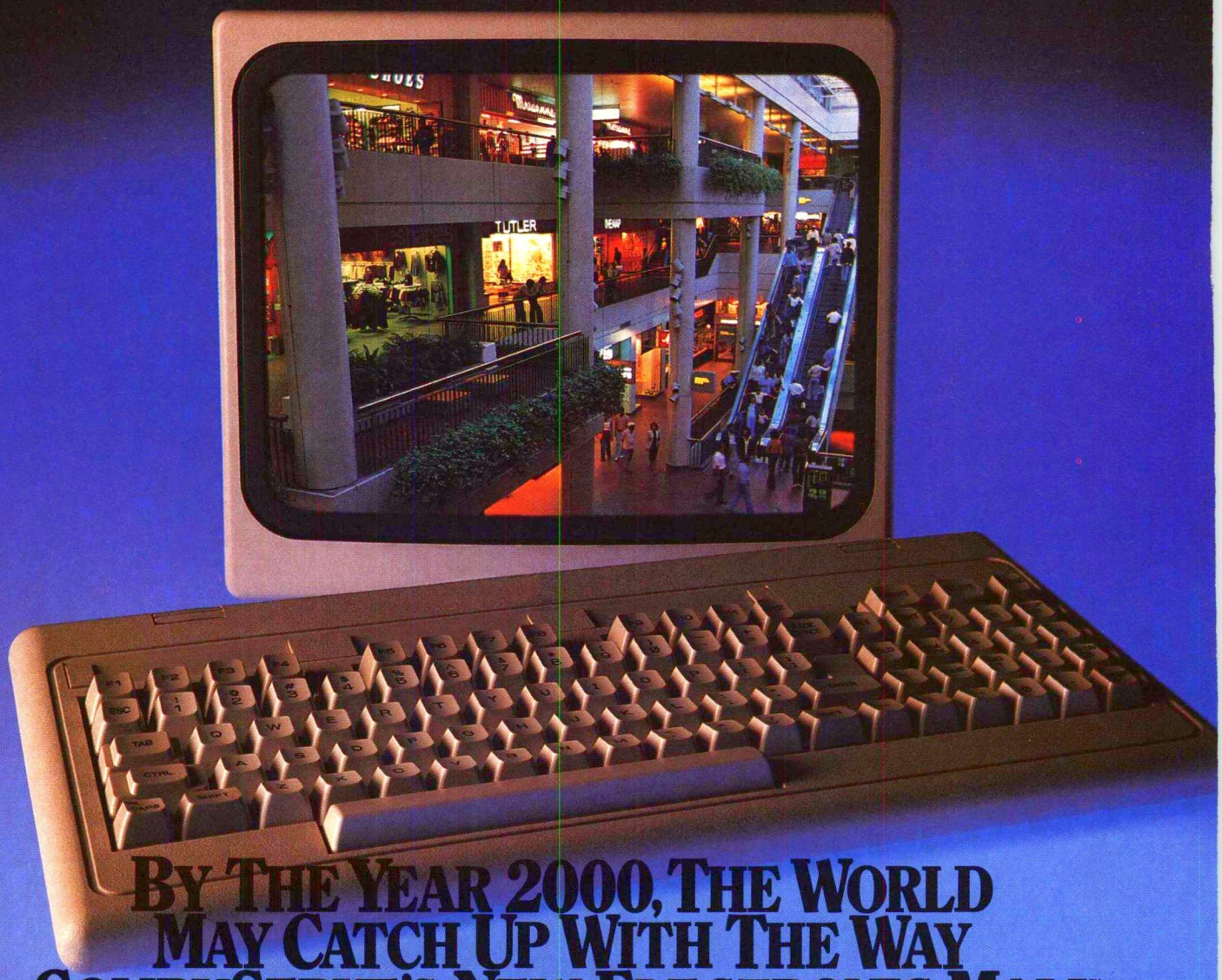
MicroTek
4750 Viewridge Avenue
San Diego, CA 92123-1690
(619) 569-0900

Omega Microware, Inc.
222 South Riverside Plaza
Chicago, IL 60606
(312) 648-1715

Precision Software
6514 North Fresno Street
Milwaukee, WI 53224
(414) 353-1666

Quadram Corporation
4357 Park Drive
Norcross, GA 30093
(404) 923-6666

Titan Technologies, Inc.
3990 Varsity Drive
Ann Arbor, MI 48104
(313) 973-8422



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- Check complete descriptions of places to stay on your next vacation.
- Pick several and request travel brochures.
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THE SMART CABLE

A CABLE FOR ALL REASONS

Hooking up your computer to an RS-232 serial-type device should be a standard and simple process, but it unfortunately has the potential to become a problem. One product that can help you avoid difficulties is The Smart Cable (SC 817) from IQ Technologies.

Because the RS-232 standard was first designed for connecting terminals with modems, its present-day usage, which has been extended to include essentially any serial device, often creates signal conflicts (see "RS-232C"). Thus, you might not be able to use that new printer, modem, bar-code reader, or plotter until you've ironed out your cable connections. A knowledgeable computer-service department can solve your problem by customizing a cable for your system, but that takes time and can be expensive if you need a cable for each different peripheral. Alternatively, you could attempt to configure your own cable or use a "break-out box" with its mini-switches and patch-bay to decide what goes where, often a time-consuming and tedious process.

Enter a Smart Connection

What you may need instead is a cable that can sense the various data, control, and handshaking signals and then make the proper connections between any RS-232 computer and its peripherals. IQ Technologies claims that The Smart Cable fills the bill, calling it "the only cable you need to own."

The Smart Cable does indeed live up to the bold claims the company has made for it. It uses its on-board logic to determine which lines need be connected to provide the necessary handshake, control, and data signals. Best of all, it accomplishes its functions automatically, at rates of up to 19.2K baud (19,200 bits per second), while being completely oblivious of word length and error and data codes.

THE SMART CABLE IS ONE OF THOSE SIMPLE DEVICES THAT COULD BE WORTH ITS WEIGHT IN GOLD.

Theory of Operation

The Smart Cable matches all a computer's handshake lines for a specific application in addition to the CTS (clear to send), RTS (request to send), and DSR (data set ready) lines to the corresponding lines of a peripheral. It does so in a three-part process. First a "test" circuit characterizes the two interfaces to which it is connected, and the "pattern comparator" circuit determines the correct interconnection pattern the application requires. Only then does the Smart Cable activate the appropriate "interconnect circuits" to complete the connection of the two interfaces (see figure 1).

This product requires only about a one-milliamp draw from each DSR, DTR, CTS, and RTS line, a negligible amount.

Installation and Operation

You can connect the Smart Cable in three easy steps. (1) You plug one end of the cable into its "logic module," and then plug the module into the computer. You connect the other end of the six-foot-long cable to the peripheral's RS-232 port, using either the male or female connector as needed. (2) You set the top switch on the module so that both of the top lights glow. (3) You set the bottom switch in the center position; if one of the bottom lights glows, you simply slide the switch toward that light. The setup is then complete.

Troubleshooting with the SC 817

In the center of the module is a red LED (light-emitting diode) that glows to indicate conditions that could disable data transfer. You can single out the offending device by simply attaching the Smart Cable to only one device at a time and observing the red LED, which lights up when the cable is attached to the offending device.

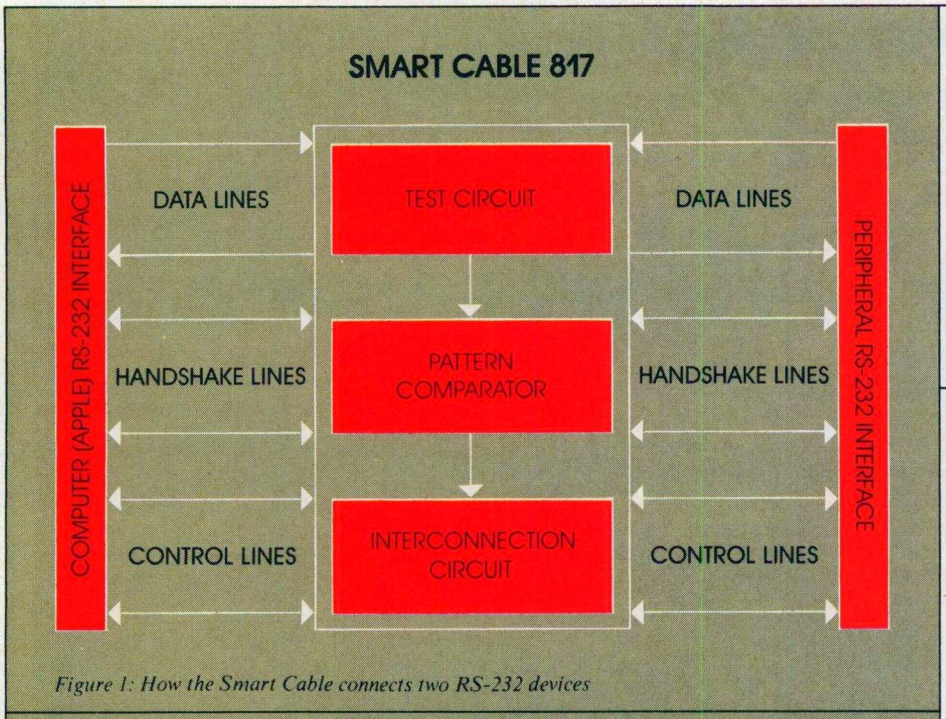


Figure 1: How the Smart Cable connects two RS-232 devices

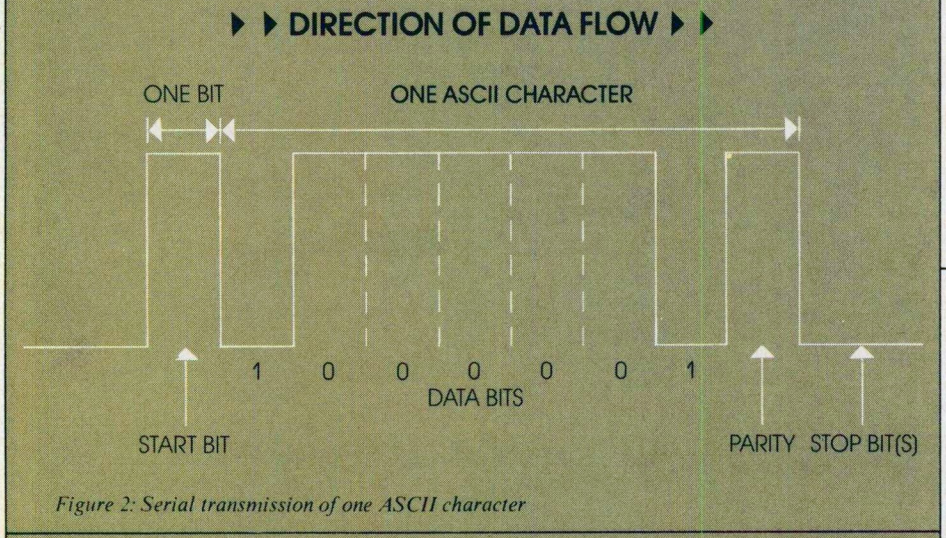


Figure 2: Serial transmission of one ASCII character

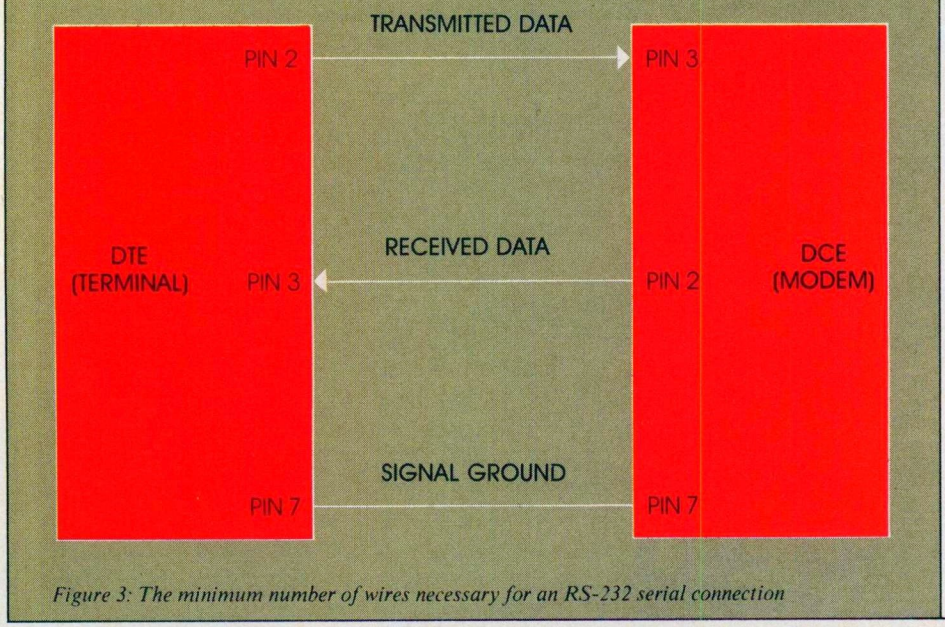


Figure 3: The minimum number of wires necessary for an RS-232 serial connection

Nice to Have at Hand

The Smart Cable is one of those simple devices that could be worth its weight in gold. With it, whether you're configuring a business system, demonstrating new equipment to a client, trying out a friend's modem, or just buying yourself a new printer, you can be certain that you'll always have the correct RS-232 connector close at hand. This product makes using a standard what it should be—no problem. +

PRODUCT INFORMATION

Smart Cable (SC 817)
IQ Technologies, Inc.
11811 N.E. First Street
Bellevue, WA 98005
(206) 451-0232

List Price: $89.95

Application: Between any two devices with RS-232 serial ports, specify male or female connector for the module end. Available for $175 is the Smart Cable 821, an enhanced version of the 817 with dual (male and female) connectors at both ends, as well as additional LEDs to indicate the status of the DTR, DSR, CTS, and RTS lines.

RS-232C

The RS-232 serial-communications protocol was originally designed to connect terminals, called "data-terminal equipment" (DTE), with modems, called "data-communications equipment" (DCE).

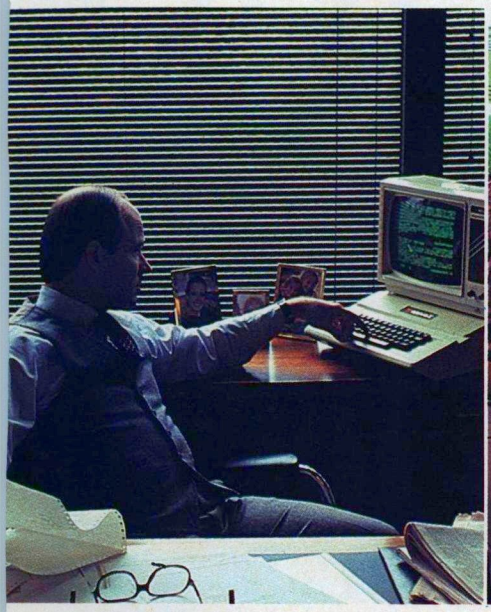
In serial communications each bit is transmitted consecutively over a single line (see figure 2), in contrast to parallel communications, in which several bits are sent simultaneously over more than one line.

The DTE sends to the DCE over line number 2, and line number 3 carries the data flow from the DCE to the DTE; line number 7 is the ground for both signals. These three lines make up a basic RS-232 interface (see figure 3).

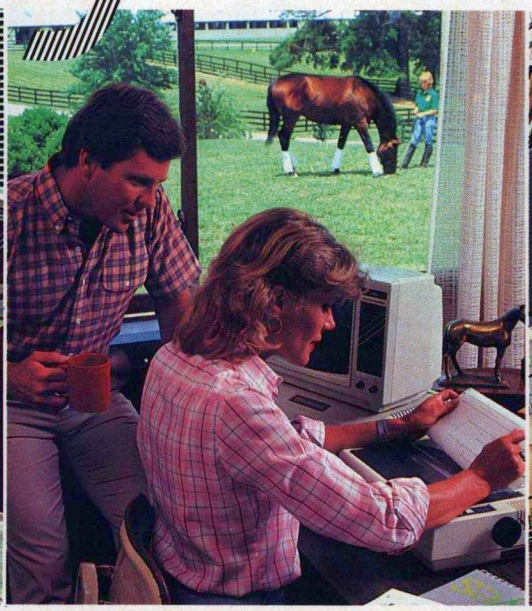
The standard RS-232 connector is a DB-25 connector, which has 25 assigned lines. If these lines need configuring for a DTE or DCE, you can have problems connecting two RS-232 ports to each other.

Your Apple's telephone.

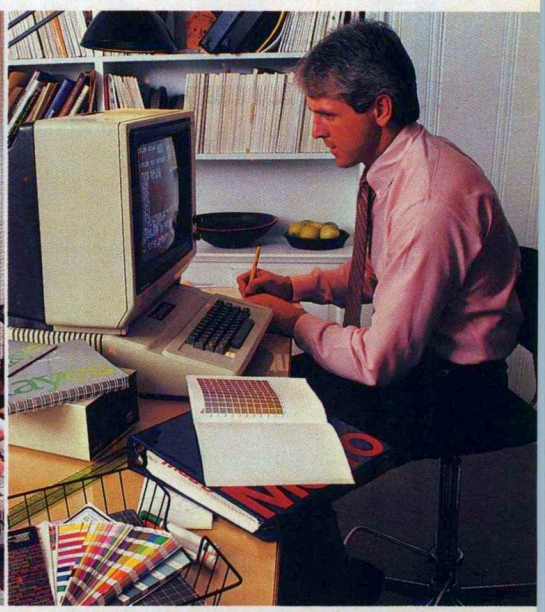
Hayes™



"Thanks for the prompt reply. Sure was a lot faster than waiting for the mail!"



"Gary: The pedigrees for next week's auction are as follows..."



"Attn. Prod., Sales, Purch.: Recommend 50% blue, 30% red screen for closest match."

A complete plug-in communications system for Apple® computers. From Hayes, the established telecomputing leader: the simple but sophisticated Micromodem IIe® plug-in board modem and its companion software, Smartcom I.™ Everything you need to expand the world of your Apple II, IIe, II Plus and Apple III. In one, convenient communications package.

With Micromodem IIe and Smartcom I, you can access data bases, bulletin boards, and the varied resources of information services. Plan your travel itinerary via computer, including flight numbers, hotel and rental car reservations. Retrieve and analyze daily stock and options prices. Work at home and send reports to your office. You can even do your gift shopping by computer!

Micromodem IIe. Think of it as your Apple's telephone. It allows your computer to communicate with any Bell-103 type modem over ordinary telephone lines, at 110 or 300 bits per second. Micromodem IIe installs easily in an expansion slot, and requires no outside power source. It connects directly to either a single or multiline modular phone jack, to perform both Touch-Tone® and pulse dialing.

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Micromodem IIe
Smartcom I

Discover how Micromodem IIe can help maximize the capabilities of your Apple. While Smartcom I software will minimize *your* efforts.

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Let Smartcom I guide you through a few easy-to-answer questions to tailor the program to your particular needs. Then you're ready to go!

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CIRCLE 271 ON READER SERVICE CARD

THE GRAPHICS MAGICIAN

This programming aid helps game-software sorcerers conjure up picturesque graphics.

The Graphics Magician
Penguin Software
P.O. Box 311
Geneva, IL 60134
(312) 232-1984
List Price: $59.95
Requires: 48K; Apple II, II Plus, or IIe; one disk drive; paddles, joystick, Koala Pad, Apple Graphics Tablet or Houston Instruments Hipad.

Software sorcerers who have visions of creating a best-selling computer game can find programming graphics tedious, time-consuming, and difficult. What they need is some sort of electronic incantation to dispel programming drudgery and conjure up charming graphics. Better yet, this electronic enchantment should combine speed, text, special effects, and minimum storage requirements in an easy-to-use format. Fortunately, such a graphics package exists.

The Graphics Magician is a programming aid that provides a set of graphic editors and machine-language routines to help users design and control fast animation of many independent objects and also draw full-screen graphics. It is divided into an animation system and a picture system.

Designed with the game programmer in mind, the animation system features "preshifted" shapes; that is, each shape has seven facsimiles stored as bit patterns. Since one byte of the screen contains seven bits, or dots, each bit pattern is shifted over one dot from the last with respect to the byte boundaries. The animation routines check a particular shape's x-coordinate and then select the bit pattern that fits the proper byte boundary. This storage scheme speeds and smooths horizontal movement and is the basis of fast animation in all professional arcade games.

The animation system comprises a shape editor, path editor, animation editor, and documentation utility. You need to use the keyboard for accurate, cursor-controlled input.

The shape editor allows you to create new shapes or alter shapes previously stored. Most of the time, the shape appears against a black background, although you can change the background color to white, green, orange, violet, or blue. You must set the height and width parameters of the shape. The maximum is 256 bytes, and 36 × 42 dots, but enlarging the shape slows its movement and takes up more memory. You must also assign a border to each shape. This border governs how fast each of the seven facsimiles appear within the byte boundaries. You can set the border from zero to seven—the larger the number, the faster the shape moves across the screen.

With the press of a single key, you can flip a shape upside down or from left to right, or rotate it 90°.

Seven frames, equal to the height and width parameters, appear on the screen, each overlined with an orange marker. As you create a shape in the first frame by manipulating the cursor up, down, left, and right, each frame with an orange marker reproduces the shape exactly. By turning the orange markers on and off, you can create seven sequenced frames that detail a shape's individual movements, such as flapping wings, flickering flames, or rolling boulders.

One quirk you can find when using the shape editor concerns frame sequencing. Changing the border number changes the frame sequence. At the default setting of 2, frames run 1,2,3,4,5,6, and 7. If you reduce the border number to 1, the frame sequence changes to 1,5,2,6,3,7, and 4. Consequently, you must remember the order of the frames when using the shape editor. Furthermore, you cannot switch individual shapes from frame to frame—this makes remembering the frame sequence doubly important.

The shape editor contains some shortcuts in basic shape creation. With the press of a single key, you can flip a shape upside down or from left to right, or rotate it 90°. You can also shift the shape within the height and width parameters, giving it a little hop, dip, or sustained vertical movement.

You can make the shape any combination of colors, but beware the idiosyncracies of the Apple, such as only plotting green and orange in alternate columns, or not plotting green next to orange or blue within the same byte. Fortunately, blending colors and using a color palette can alleviate some of these aspects.

Once you are satisfied with the shape, you can test how all seven frames look in sequence. The shape travels from left to right, then from right to left, across the bottom of the screen. You can edit whatever anomalies appear by reentering the frames and altering the shapes. The shapes are then saved on disk.

The path editor allows you to draw

preset paths for your shapes over a background picture. As with the shape editor, you select the path by manipulating the cursor. Up, down, left, and right use the I, M, J, and K keys respectively; and diagonal movement occurs with the U, O, comma, and N keys. Pressing D deletes the last command, and C clears the entire path and lets you start again.

The path editor can move a shape from one to seven dots at a time, or register a pause. Because of the idiosyncracies of the Apple, however, if a shape has a color other than white or black, you must set horizontal movement in multiples of two to retain the color. The shape always keeps its proper color when moving vertically. Paths are saved on disk.

Block type is the simplest, fastest, and easiest to learn, and it requires the least amount of memory.

The animation editor lets you combine up to 32 shapes and 32 paths on one screen. The "screen" is actually 6.4 screens wide and wraps around, so a shape traveling in a straight line off the right side eventually appears on the left side.

You load the appropriate shapes and paths and assign each shape a starting coordinate and path. Each shape can have its own path, share paths with other shapes or can have a combination of the two. You can assign or end paths with a single keystroke. You can test how shapes and paths work together, edit any aspect of this animation sequence and change animation types.

The Graphics Magician contains four animation types: Block, Xdraw, Block with Background and Block with Background Xdraw. Block type is the simplest, fastest, and easiest to learn, and it requires the least amount of memory. It has two disadvantages. It does not detect collisions between shapes—for example, between a missile and a spaceship—and if a shape travels across a multicolored background, the shape erases the background as it moves.

The Xdraw type displays a shape by reversing the background on the screen, then rereverses it to restore it. If a shape is put on a black background, the shape appears as you drew it, but on a white background, the shape appears in negative form. If you place it on a color background, you lose some detail from both the shape and background. Xdraw registers collisions and won't erase the background, but shapes suffer a slower speed and slight flicker.

For most applications, you should use the animation type Block with Background. It works in the same way as Block but also detects collisions between a shape and background object and restores a background crossed by most shapes. Some shapes, since they are created using Block type animation, erase the background.

Block with Background Xdraw solves Block with Background's minor problem of some shapes erasing the background, but it decreases the speed of the program.

The Documentation utility is not necessary to create graphics but comes in handy at times. It lists all the shapes, paths and memory locations of all animation and allows you to delete unused shapes and paths. You can send all information to a printer for a hard copy.

The picture system for drawing full-screen graphics features "sequential pictures." That is, the computer stores the commands used to draw the picture instead of saving the picture itself. Full-screen pictures take 8K, or about 8000 bytes, of storage, but the drawing commands can be saved in hundreds of bytes. This space-saving feature lets you fit between 50 and 100 pictures per disk side rather than just 12 8K pictures.

The picture system starts with a clean screen. You enter data by using the keyboard, a joystick, paddle, trackball, or Apple Graphics Tablet. You can load a previously stored picture or draw a new one. You switch between a selection screen, which lists all drawing commands and options, and the actual picture by pressing the space bar.

The four drawing commands are easy to learn and use. You can draw a line, type uppercase and lowercase letters in standard or reversed text, fill an area with color, and color individual portions of the screen. You can choose from a palette of over 100 color mixes.

You can test your artwork by pressing R for redraw, which reconstructs the picture as it would appear in a program. The Edit mode allows you to add or delete single commands anywhere within the drawing sequence.

The Graphics Magician is a flexible programmer's aid, and you must, repeat must, do some programming to create a game. The pictures, shapes, and paths are placed in memory or on disk, and you must write routines to call and control the artistry on the screen. The programming can be as simple as a four-line BASIC routine to display a single shape, or as complex as machine-language routines manipulating multiple shapes over many pictures. By essentially doing most of the graphics routines for you, The Graphics Magician significantly reduces the amount of programming needed to create a game. Note that The Graphics Magician is geared primarily for game animation. Although you can draw graphs, tables and charts for business applications, other programs are available that perform those functions faster and more efficiently.

You can program several tricks into a game using The Graphics Magician. You can control shapes using a joystick or keyboard. You can place invisible shapes on the screen to be activated only when another shape collides with them. Similarly, shapes can disappear when hit or be picked up and transported from screen to screen. Since most of these tricks are standard game fare, The Graphics Magician can dramatically decrease the time needed to program them.

The 78-page manual contains thorough step-by-step instructions and explanations on how to use The Graphics Magician. The booklet is filled with programming hints and examples and written in a clear and straightforward style. It contains abundant technical information about memory addressing, which you may or may not ever use, but might find handy anyway.

You can program several tricks into a game using The Graphics Magician.

The Graphics Magician comes on a copyable disk, and your own programs can access all routines. If you use any of The Graphics Magician's copyrighted routines in your own commercial programs, you must obtain a license, which carries no fee, from Penguin Software.

The Graphics Magician can help software sorcerers dispel the tedium involved in conjuring up picturesque graphics. Fast, simple, and versatile, it offers a cornucopia of features for advanced-machine-language programmers, as well as BASIC apprentices. The Graphics Magician could well become a programming wizard's most powerful talisman. ✚

Something no modem has ever said before.

If you're looking for a premium modem without a premium price, here's a word of advice: Apple.

Introducing the Apple® Modem 300. And, to keep up with the business world, our faster Apple Modem 1200.

As you'll notice, the Apple Modem is hardly noticeable under a desk phone.

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That one familiar symbol tells you as much as a gigabyte of specs. It says Apple quality. Apple technology. And in the unlikely event you should need it, Apple service.

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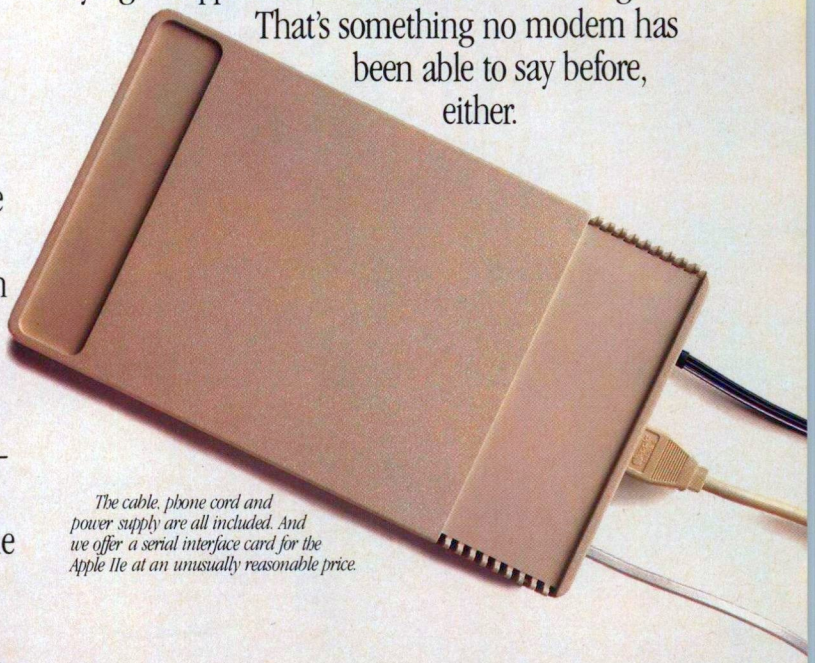
And since the computer age happens to coincide with the plastic age, you can charge your Apple Modem with an Apple Credit Card.

Which, along with the low price, makes buying an Apple Modem as much fun as using one.

That's something no modem has been able to say before, either.



The cable, phone cord and power supply are all included. And we offer a serial interface card for the Apple IIe at an unusually reasonable price.

Soon there'll be just two kinds of people. Those who use computers. And those who use Apples.

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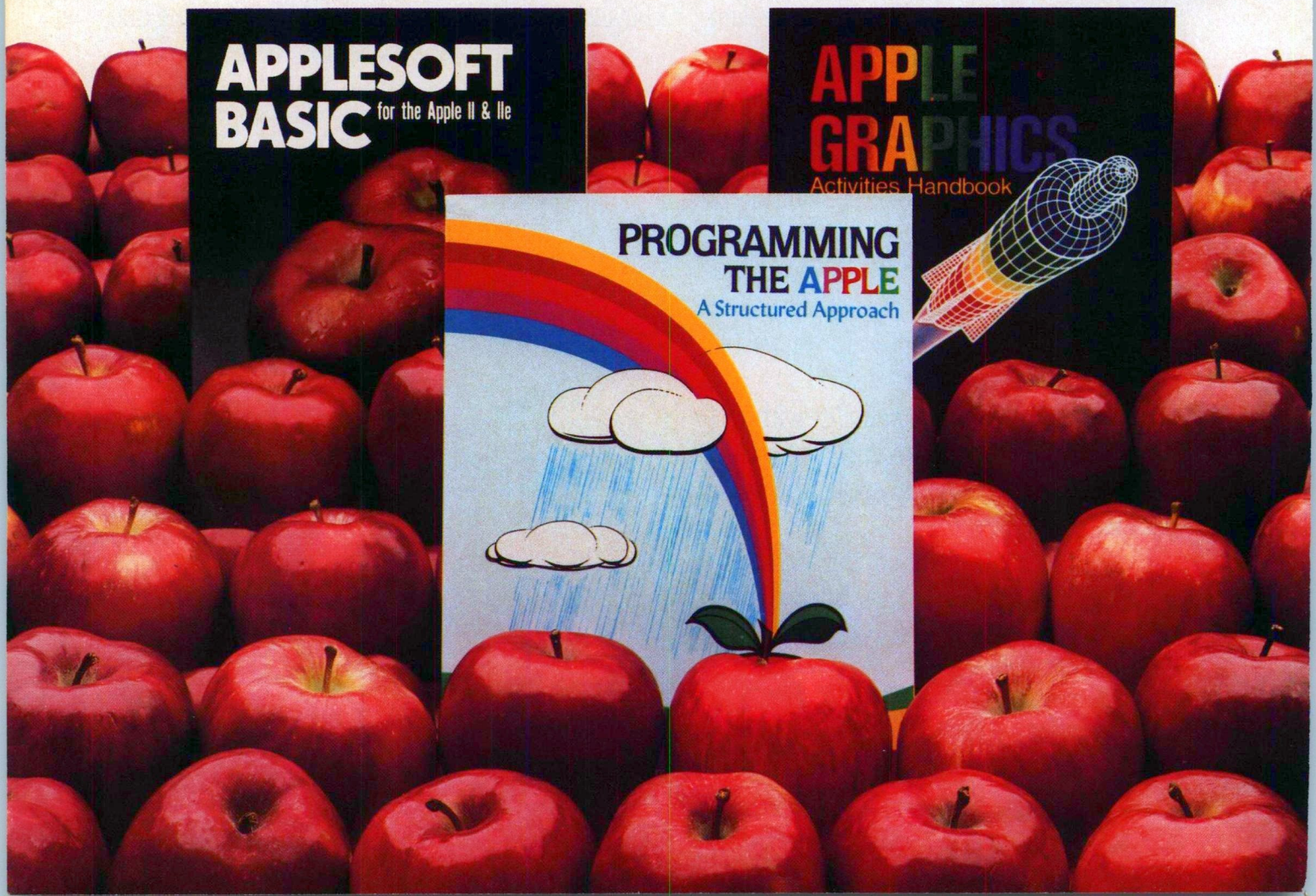

▸SOFTWARE REVIEW/BY W. CHARLES DOHERTY

VIZ-A-CON AND VIZ-A-MERGE

Now you can combine a series of spreadsheets into a single Summary and move information from one spreadsheet to another.

If you have an application that requires a combination of data from several spreadsheets, take a look at two new programs from Abacus Associates: Viz-A-Con and Viz-A-Merge.

The programs both work with VisiCalc, the grandfather of all electronic spreadsheets. Since its introduction five years ago, VisiCalc has outsold all other business programs, becoming the most popular piece of nongame software in history.

Combining information from one spreadsheet with that of another can be especially difficult.

VisiCalc owes much of its success to the program's ease of use; even a nontechnical person can use the system with a minimum of instruction. VisiCalc makes many traditionally tedious business and financial calculations easy, while also permitting development of many new series of figures.

After using VisiCalc (or a compatible program) for a while, however, you learn its limitations. Combining information from one spreadsheet with that of another can be especially difficult. Although it is not impossible, moving data from file to file can be so time-consuming that it often isn't worth the trouble.

Program Description

Viz-A-Con combines a series of spreadsheets into a single summary. For example, if a retailer uses VisiCalc to prepare daily sales reports showing totals per salesperson and department, he can use Viz-A-Con to combine these separate records into one file. Every 30 days, Viz-A-Con can add a full month's worth of reports, giving a monthly sales summary.

The concept behind Viz-A-Con is simple; you specify which files you want combined, and the program adds up the same locations from each file. Think of it as though you had stacked the files one upon the other, adding a third dimension to your spreadsheets. Row 4, column 2 of one file combines with row 4, column 2 of the others, and so on throughout the spreadsheet. The sums are stored at the same locations in the finished product.

The program uses the labels of the first file specified for consolidation on the final version, ignoring all other labels. You lay out this first "format file" so it looks like the final product you have in mind. Using our example of a monthly sales report, the first file in the group might have headings such as Monthly Sales Totals:, and these would be the only labels to appear on the summary.

Each run of the program consolidates as many as 50 files. Larger numbers of files are processed in groups; after processing them, the program can combine the resulting files. With Viz-A-Con, you can actually process any number of files.

Viz-A-Merge resembles Viz-A-Con in that it combines data from several spreadsheets into one. Viz-A-Merge is different in that it takes information from *any part* of one spreadsheet and places it at any part of another. Abacus Associates refers to this process as a cut-and-paste operation, where information is "cut" from one file, and is "pasted" at the desired location of another.

A typical application for Viz-A-Merge consists of preparing a company's budget projection. Data from various departments can be taken from individual reports and merged into a company-wide analysis. You can add columns or rows to show the percentage of the total for each department.

Use DIF Files

To process files with either Viz-A-Con or Viz-A-Merge, you first store them to disk under the DIF (Data Interchange Format) from VisiCalc. DIF files differ from ordinary files in that they save the data itself, rather than the formulas used to calculate it. As the name implies, the Data Interchange Format allows various files or programs such as Viz-A-Con and Viz-A-Merge to share (or interchange) data. The files these two programs produce are also in the Data Interchange Format, and you can load them from VisiCalc for further processing.

The Data Interchange Format allows various files or programs such as Viz-A-Con and Viz-A-Merge to share (or interchange) data.

By answering prompts from the pro-

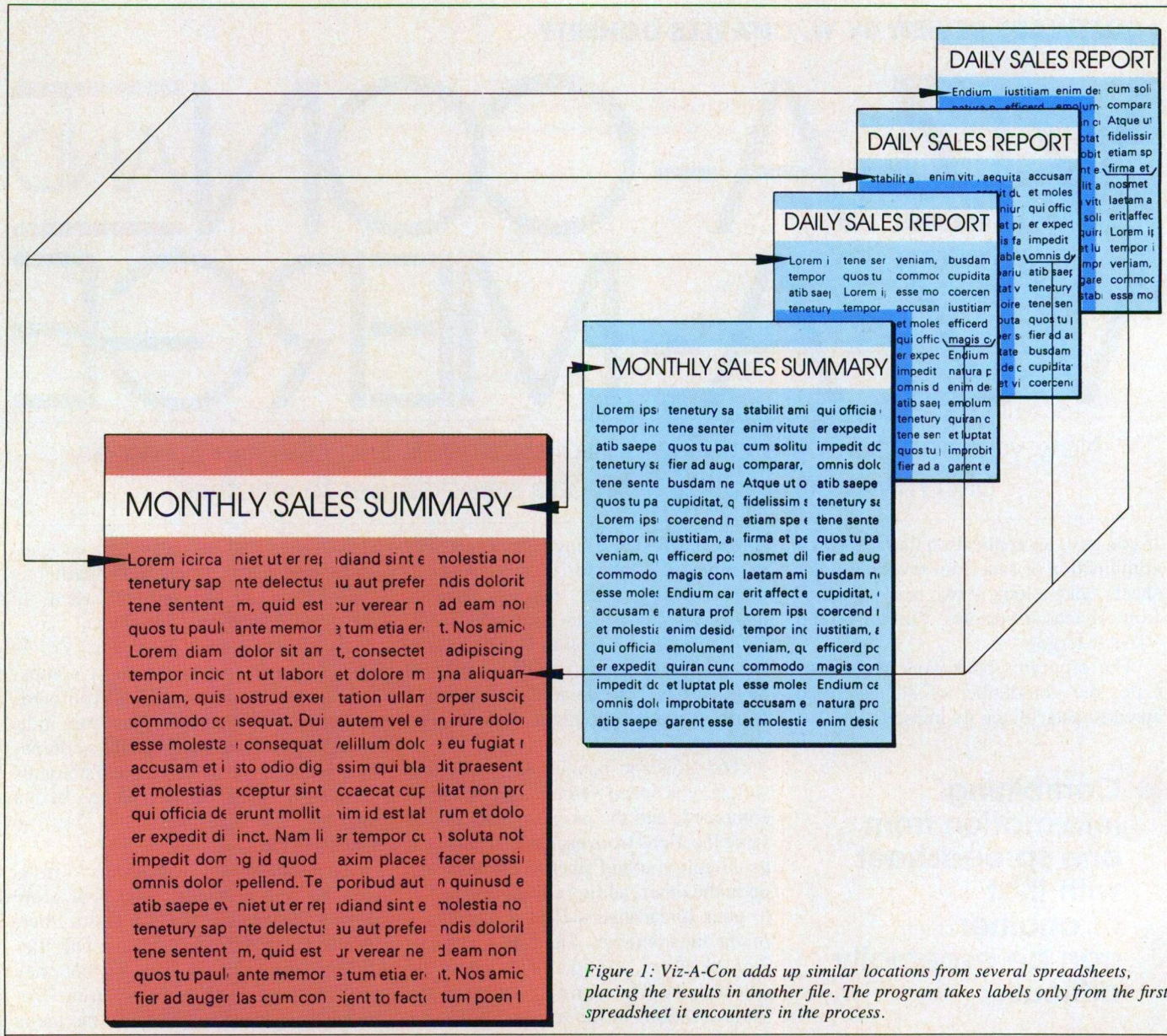

Figure 1: Viz-A-Con adds up similar locations from several spreadsheets, placing the results in another file. The program takes labels only from the first spreadsheet it encounters in the process.

gram, you can set up a consolidation process. You specify the files you want combined, making sure the first in line contains the labels you desire on the finished product. All of the files must have the same number of rows and columns in order for Viz-A-Con to work properly. Usually, these files appear identical except for the data itself.

After describing a process fully, you can save the steps involved. You need not go through the entire setup procedure for each consolidation; just run the appropriate routine. For example, you can save the steps you need to process a weekly sales summary in a file named Weekly Report and specify this whenever you want a weekly report. Another routine would be on hand to take care of the monthly report.

When the program completes a process, you can print the results immediately or save them as a DIF file for later processing by VisiCalc. Although all of the information is there, it is not always desirable to print the data directly. DIF files have no format information, so data cannot be justified or given with a certain number of decimal places (financial work, for instance, usually requires a data display with two decimal places). Passing the file through VisiCalc rapidly puts the final product into a more presentable form.

You can store data you produce with Viz-A-Con and Viz-A-Merge to disk in a format compatible with most word-processing programs.

You can store data you produce with Viz-A-Con and Viz-A-Merge to disk in a format compatible with most word-processing programs. You may use as many or as few of the options as you want, depending on your particular needs.

Viz-A-Merge also requires you to store your data to a disk with the DIF option of VisiCalc. And, as with the other program, finished data is in the DIF form. You can print the final product directly or save it as another file giving VisiCalc or a word processor the ability to manipulate the data.

Setting up a merge process is complicated. In fact, you need to use a worksheet to plan the procedure. Since the program only includes one blank worksheet, you should make several copies of it before starting. On this sheet, you list the names of files that you want merged

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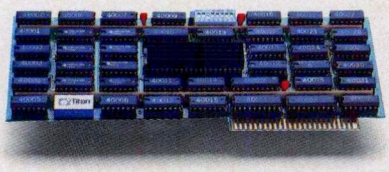

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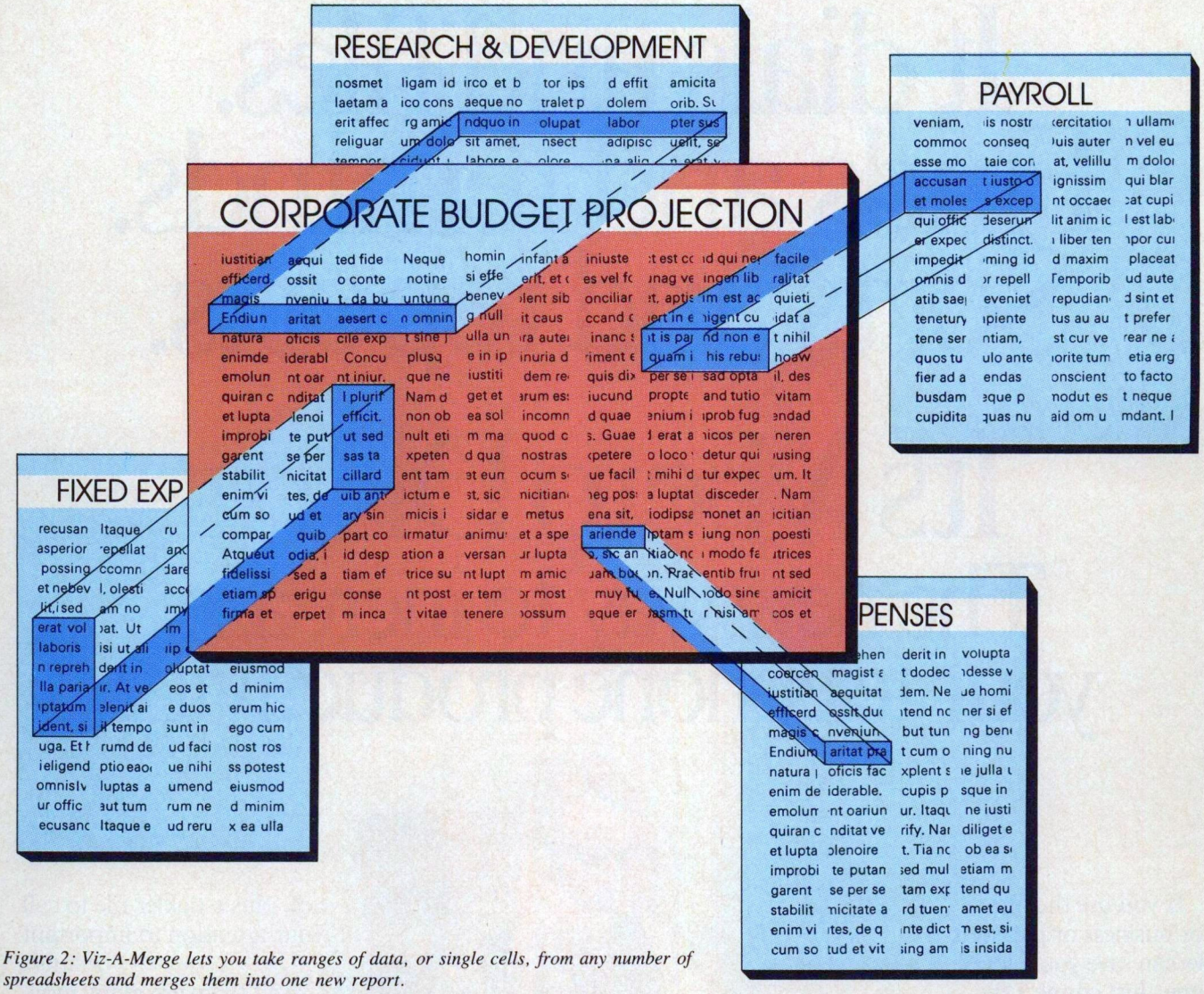

Figure 2: Viz-A-Merge lets you take ranges of data, or single cells, from any number of spreadsheets and merges them into one new report.

and the parts of the files that you want to use. If a file named Research Expenses contains the department budget totals in column 5, rows 3–9, you list the file-

Though the manual definitely needs revision, it does contain the pertinent information.

name on your worksheet along with these coordinates.

Next, list *where* you need this data range on the destination file. The specified destination indicates where the first cell of the group is to be stored; the program puts the remaining cells in the order in which they emerged from the source file.

Once you list the filenames, the source locations, and their destinations on the worksheet, Viz-A-Merge saves your information. After laying out a process, you can save the steps and use them later on, without reentering the worksheet.

Documentation

The manuals for these programs come in full-size loose-leaf binders, with index tabs for locating various sections. The documentation style, however, does little to clarify the procedure. Unless you already have some experience with this type of program, the manuals will not provide you with much assistance. Several difficult concepts should be clarified with illustrations in future versions. Even though the manual definitely needs revision, it does contain the pertinent information; it is just a bit hard to locate.

Comments

Both Viz-A-Merge and Viz-A-Con performed as promised, and I found the setup procedure quite easy, once I got the hang of it. I was suddenly able to do some of the things that I had always wanted to do with VisiCalc but had thought impractical.

If you occasionally wish you could do more with VisiCalc, these routines may be just what the doctor ordered.

Before you consider either program, you should be familiar enough with VisiCalc that terms such as *DIF files* do not intimidate you. In order to derive the most benefit from these enhancement routines, you first need a thorough understanding of VisiCalc itself.

With Viz-A-Con and Viz-A-Merge, experienced VisiCalc users can combine data more efficiently. ✚

PRODUCT INFORMATION

Viz-A-Con and Viz-A-Merge
Abacus Associates
6565 West Loop South
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Bellaire, TX 77401
List Price: $99.95 each for Apple II version; $139.95 for Apple III version
Requires: Apple II, II Plus, IIe, or III; VisiCalc; one disk drive

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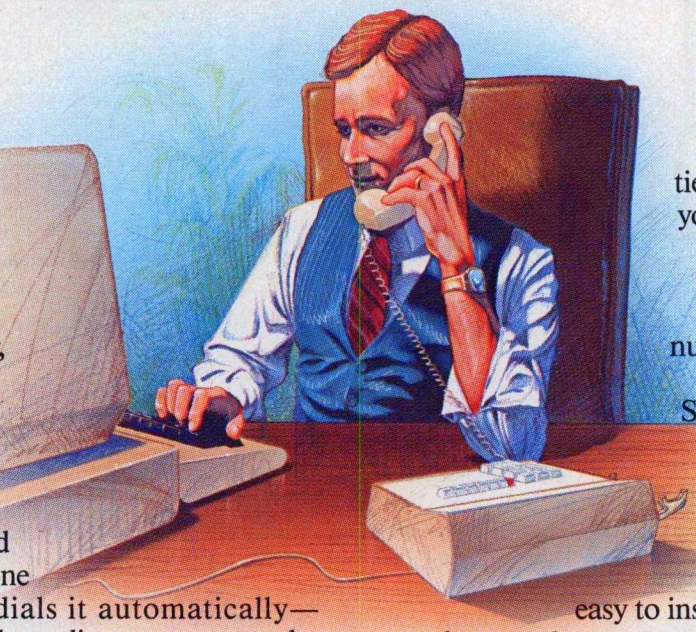

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▶HARDWARE-SOFTWARE REVIEW/BY CHRIS ALBERTSON

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List Price: $129 (less $25 with coupon included in Music Construction Set)
Requires: Apple II-series computer (or equivalent); two 8-ohm speakers

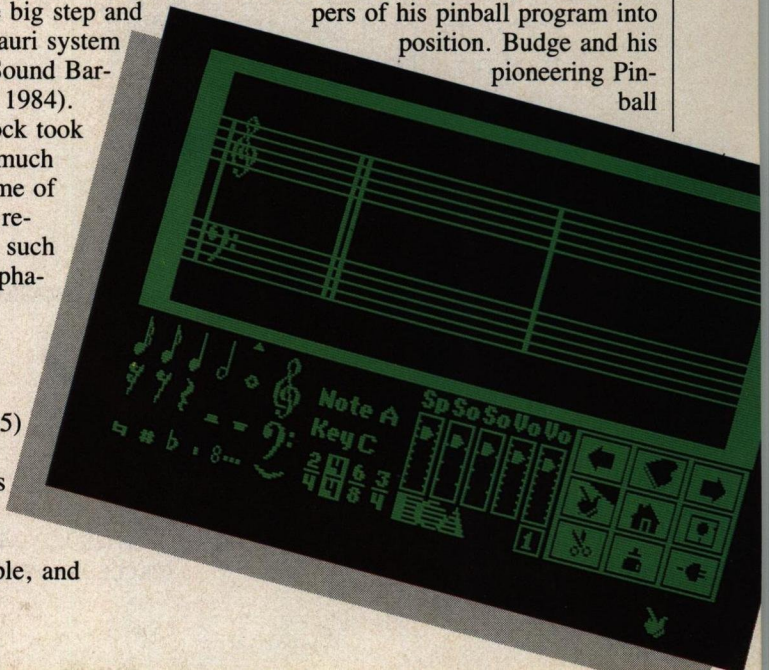
Until recently, obtaining a decent musical sound from an Apple involved expenses most owners found prohibitive. Now the Music Construction Set and the Mockingboard Sound II card, a pairing of software and hardware, offer amateur composers an affordable, listenable solution.

Only about five years ago, Apple owners and their friends were impressed by a little program called Applevision. Written by Bob Bishop, it came on the DOS 3.2 and 3.3 System Master diskettes. It served well as an introduction to the Apple's music and high-resolution animated-graphics capabilities. Applevision was by no means a dazzling product, but home computerists were less demanding in those days, and when the program drew a simple hi-res room with a TV on a table, faces lit up. Bishop's *pièce de résistance*, however, was a little man who appeared on the screen-within-a-screen and danced to "Turkey in the Straw." The little man, made of a handful of pixels, showed us the Apple II's graphics and sound potential.

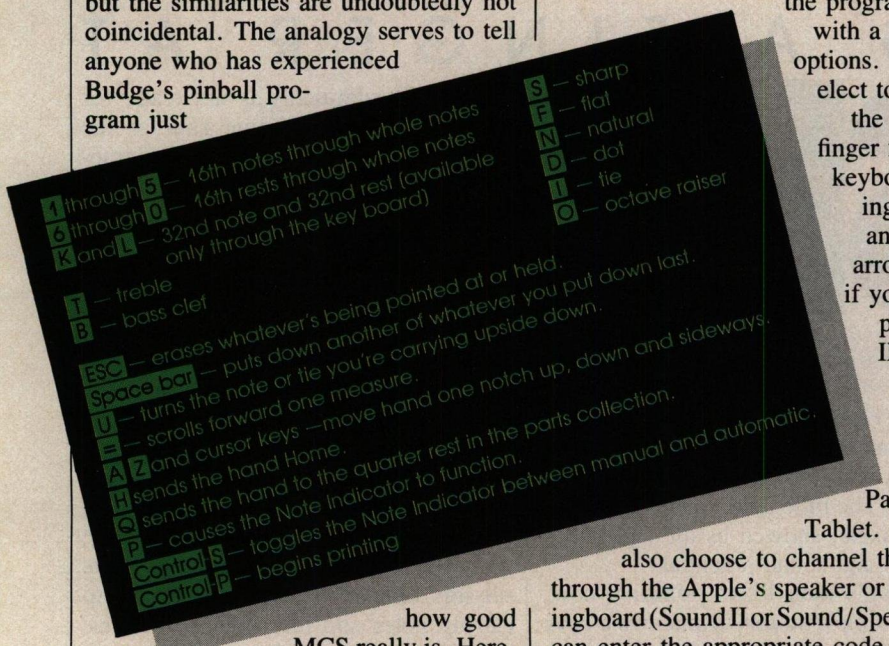
Bishop's man looks primitive now, and the simple strains of his music have long since been surpassed by such programs as Paul Lutus' Musicomp and Electric Duet, which have the Apple generating two-voice music of remarkable quality. Walter Marcinko, Jr., employed the latter program to create The Music Disk, which contains a large and extraordinarily well-rendered repertoire ranging from Scott Joplin's "The Cascades" to Chopin's "Valse Brilliante." Still, there is only so much the tiny Apple speaker can do, and although connecting an outside speaker to your system yields better sound quality, the clicks are still audible, and the two-voice limitations remain.

One solution is to add a synthesizer board, such as the ALF Synergizer; another is to take the big step and plug in an alphaSyntauri system (see "Breaking the Sound Barrier," *A+*, February 1984). Pianist Herbie Hancock took the latter route with much success—witness some of his fusion albums of recent years. Although such attachments as the alpha-Syntauri can turn a beeping Apple into a professional musical instrument, its high cost (starting at $1295) is prohibitive. Don't worry—there are less draining ways to produce respectable music from your Apple, and although it admittedly is not ready for performances at Carnegie Hall or the Hollywood Bowl, the Music Construction Set (MCS)/Mockingboard combination is a fairly inexpensive way to create listenable computerized music.

Similar programs and peripheral cards (e.g., Applied Engineering's Super Music Synthesizer) are available, but none is more fascinating to work with than MCS. The figure below shows a working screen of this program. The work screen contains most of the symbols available and displays the current status of each tune, as you load it. The nine icons are in the lower right corner; the "beat counter" is to the left of the scissors. Using the keyboard shortcuts to call up notes and rests is easy because they are in numerical order. Thus you can produce sixteenth notes (far left) at the finger cursor by pressing "1," eighth notes by pressing "2," etc. The icon in the lower right corner is the Plug icon, which you use to change printer code and speaker defaults. Like Bill Budge's Pinball Construction Set, of which it is reminiscent, MCS is easy and fun to use, and it has the potential for being a powerful learning tool. The packaging and promoting of this program give full credit for authorship to Will Harvey, a 16-year-old, about whose tender age much hoopla is made. The Budge touch is unmistakable, though, right down to the same pointing hand that moves the bumpers and flippers of his pinball program into position. Budge and his pioneering Pinball



Construction Set are also under the Electronic Arts umbrella these days, so the close resemblance is not surprising. I don't mean to take credit away from Harvey, who probably deserves most of it, but the similarities are undoubtedly not coincidental. The analogy serves to tell anyone who has experienced Budge's pinball program just how good MCS really is. Here, instead of positioning flippers and bumpers, one places musical notations on a staff, essentially performing on a hi-res screen what a composer normally does on paper.



If you leave it unattended after booting it, MCS will go into a demonstration mode, performing the ten selections that come on the diskette. Press Return, and the program starts with a series of options. You can elect to control the pointing finger from the keyboard (using the up- and down-arrow keys, if your computer is a IIe), with a joystick, or with the Koala-Pad Touch Tablet. You can also choose to channel the sound through the Apple's speaker or a Mockingboard (Sound II or Sound/Speech) and can enter the appropriate code for your dot-matrix printer.

Yes, Music Construction Set can give you a hard copy of your music, albeit a slightly rough one. I tried all three cursor options and found them to be equally easy to use, but I soon found myself abandoning them to take advantage of the program's built-in shortcuts, which allow you to place most notes and rests with one or two keystrokes (see figure, this page).

If you don't already have it, Electronic Arts tempts you to buy a Mockingboard by including a certificate that reduces the price by $25. I strongly recommend that you take advantage of the discount, because although the Music Construction Set functions admirably without the Mockingboard, once you have heard your work—or, for that matter, Mozart's or Gershwin's—in stereo with six voices, the Apple speaker will no longer satisfy you. The Mockingboard Sound II is a good investment with or without MCS, for it comes with software that allows you to produce spectacular stereophonic sound effects. Several games currently on the market are designed to take advantage of the card's sound properties.

Although MCS is designed to work with either version, I refer here to the Mockingboard Sound II, not the Mockingboard Sound/Speech, which includes speech abilities but is monaural (the Sound II version has room for two SSI-

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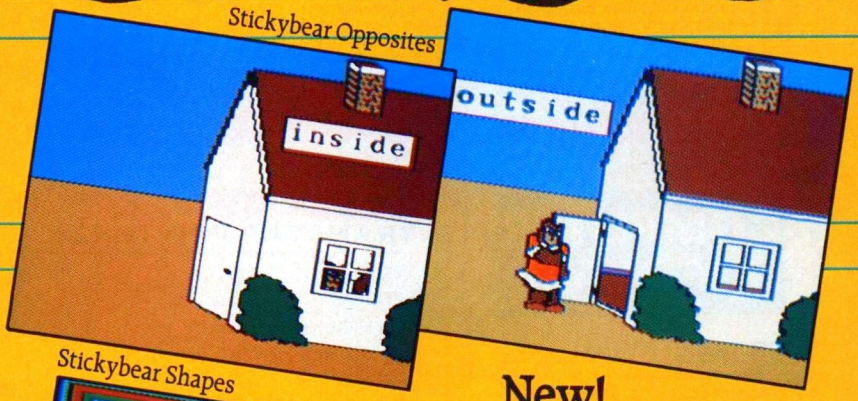

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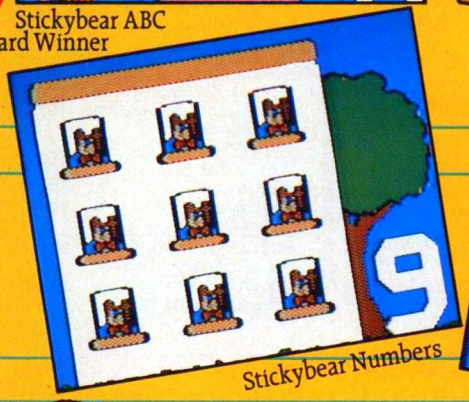

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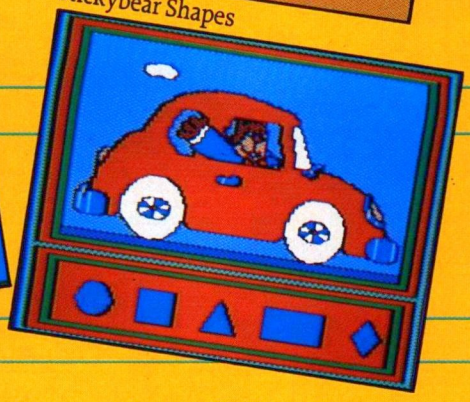

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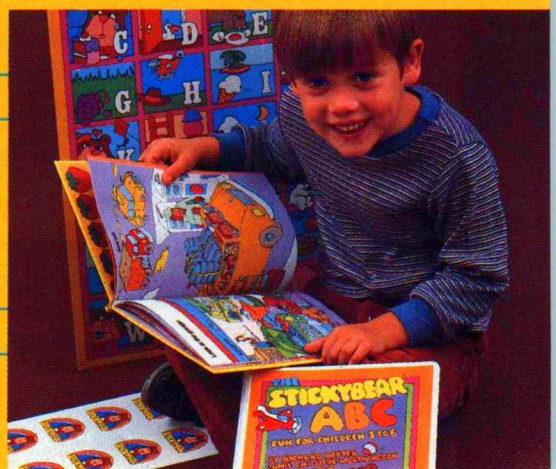

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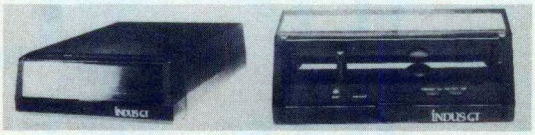

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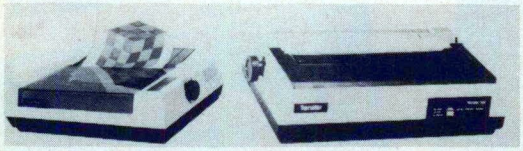

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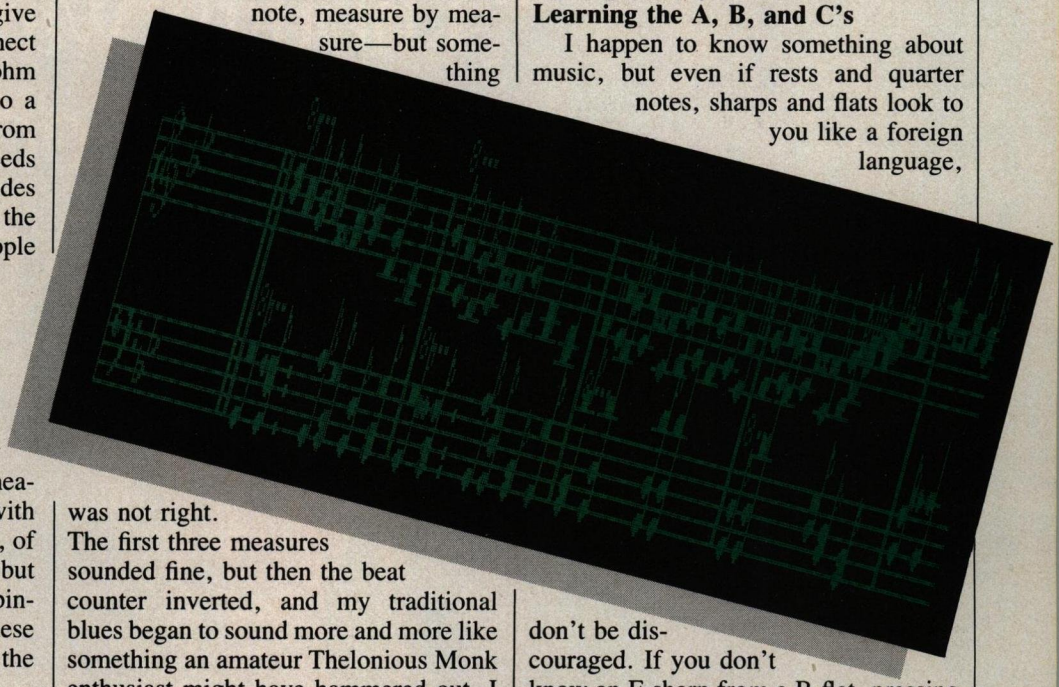
263 speech-synthesis chips, which will soon be available).

You can plug the board's two RCA connectors into an amplifier's auxiliary input, but you don't have to, because its two half-watt amplifier chips will give you ample volume when you connect them directly to a couple of 8-ohm speakers. I have mine hooked up to a pair of Realistic Minimus-7s (from Radio Shack), and the sound exceeds most people's expectations. Besides vastly improving the audio output of the MCS, the Mockingboard frees the Apple from its sound-generating chores, handing the reins over to the graphics functions. Thus, the program can scroll the music from right to left on the screen as it plays. It can also activate the beat counter, which serves to signal—by turning to inverse video—when a measure's number of beats is not in line with the selected time signature. You will, of course, hear any such discrepancy, but the beat counter makes it easier to pinpoint the source. You sacrifice these important features when you use the Apple's speaker.

Blues Gone Awry

To test the various features of MCS, I "constructed" "Backwater Blues," a 1927 composition by blues singer Bessie Smith. Using a transcript of the original recording, from a songbook I authored a few years back, I entered pianist James P. Johnson's accompaniment note by note, measure by measure—but something was not right.



The first three measures sounded fine, but then the beat counter inverted, and my traditional blues began to sound more and more like something an amateur Thelonious Monk enthusiast might have hammered out. I solved the problem easily by counting the beats and, since "Backwater Blues" should be played in 4/4 time, making sure that each measure contained exactly four. Once I corrected this difficulty, MCS performed the old blues respectably, with the treble and bass staffs playing in perfect synchronization.

Learning the A, B, and C's

I happen to know something about music, but even if rests and quarter notes, sharps and flats look to you like a foreign language, don't be discouraged. If you don't know an F-sharp from a B-flat, pressing P or Control-S activates the "note indicator," showing exactly which note or position the little hand is pointing to; if

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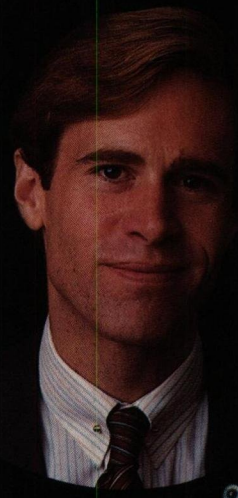

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you have a Mockingboard, you'll also hear the note.

Obviously, MCS could become a key to a better understanding of music, its rules, and its notation. Fully aware of this, author Harvey, with Douglas Fulton, who adapted and arranged the music on the diskette, has included several musical examples—in addition to the aforementioned ten—designed specifically as tutorials. If you *are* treading on unfamiliar territory and wish to take advantage of MCS's potential as a learning tool, I recommend a perfect companion program: Apple Music Theory, a series of drills designed to teach the fundamentals of music. It was developed by Linda Borry of MECC (Minnesota Educational Computer Consortium) in conjunction with Apple Computer, which markets it. After you have worked with MCS for a while—entered music, played it, revised it, and carefully listened to the changes—you can test yourself with the Apple Music Theory program, and all the pieces will soon fall into place. Next thing you know, you will be moving the little hi-res hand in sequences you've never explored. In other words, you will be composing.

No matter how intimate your knowledge of music is, you shouldn't expect to write a symphony with it.

Yes, you can compose a ditty or two using the Music Construction Set, but no matter how intimate your knowledge of music is, you shouldn't expect to write a symphony with it. While it is an amazing program, capable of generating impressive sounds from an Apple, it will not turn your computer into a professional musical instrument. The limitations are surprisingly few, however. It is, for example, impossible to enter a triplet, so you have to improvise, so to speak, and use dotted notes to approximate the desired effect. Only advanced music makers will notice the other little restrictions. One drawback that's easy to recognize is the size of the work space, which leaves very little room in each measure. There are no provisions for widening the space between the vertical lines that separate measures, so things can easily get a bit cramped, but that is largely a cosmetic problem.

Vertical space is another matter: by placing the octave raiser above the top staff, one can eliminate the overlap between the bass and treble clefs, and thus work within a full five-octave range. Placing the octave raiser to the left of the double bar raises everything on the top staff a full octave, but measures can also be raised individually. The figure on page 73, an Epson MX-80 printout of the first four measures of Mendelssohn's Scherzo, from *A Midsummer Night's Dream,* shows how I overstepped normal range limits by putting an octave raiser (the "8 . . ." symbols above each measure) above the top staff and lowering the notes one octave below what I originally wrote. Had an octave raiser symbol been placed above the staff to the left of the double line, the entire song would have been raised.

A close look at the working screen suggests other limitations, such as the absence of 32nd notes and rests, but don't worry—they are only a keystroke away. There simply wasn't room for them on the graphics page. Press the K and L keys, respectively, and these symbols will pop onto the screen at the tip of your cursor's finger.

Clipped Notes

Another excellent feature of MCS is that it lets you cut and paste measures, both within a song and from one song to another. Like everything else in this program, the performance of these two functions is easy. To cut the music, simply "pick up" the scissors; to paste it, pick up the glue pot. You can cut several measures at once by entering the number of measures after you have placed the scissors over the first measure. The scissors work on only one staff at a time, but that is an advantage, for it lets you try a melody against a variety of bass lines or rhythms. If you attempt to cut more notes than the buffer will hold, a warning beep sounds, but you won't lose any data. The glue pot inserts the contents of the buffer, pushing existing measures to the right, much as a word processor does.

Of the five gauges at the left of the "icons," only one works if you choose the Apple-speaker option. It controls the speed of the playback, and if you place it incorrectly, it can dramatically affect the outcome. You need the Mockingboard to take advantage of the sound and volume controls, which come in pairs; each affects a different staff and speaker. Every time you move the volume controls, a note sounds to indicate the loud-

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ness level—a nice touch—and the ability to turn either staff all the way down is helpful when you search for sour notes. The sound controls have four positions: regular, smooth (continuous), vibrato, and drum. You will probably wish to keep these controls in the first two settings, but you can obtain some interesting percussion effects with the last setting. The diskette has several examples in a file named Rhythm. Chalk up another mark for the Mockingboard.

The working screen also indicates the current key, which you can transpose, provided it is within the proper range. If the key you request is too high or low, you hear a beep, and the program reverts to the original setting. Transposition is a simple matter of pointing the finger and pressing Return to start the key options scrolling, then repeating the procedure when the desired key appears. Only major keys are shown, but a key-signature chart in the manual shows how to make the conversion to minor.

Loading and saving music is also easy. Placing the hand on the disk icon and pressing Return opens the program to such DOS commands as LOAD, SAVE, and CATALOG. SAVE BLUES,D2 writes a file named BLUES to an initialized disk in the second drive, for example.

To Print or Not to Print

If you have a dot-matrix printer, chances are good that you can also get hard copy of your music. According to Electronic Arts, the program is set to work with an Apple dot-matrix printer, C-Itoh ProWriter, NEC 8023, "or a look-alike for any of these three." If your printer is none of the above, the reference card offers some tips for entering a printer code and gives one example, for an Epson with Graftrax Plus. Even after a thorough study of the MCS and Okidata manuals, I could not get my Okidata 92 to produce a comprehensible printout, so I tried the Epson MX-80, entering the code listed for that printer on the MCS reference card. It worked, but only after a call to Electronic Arts. The code, as printed, is very unclear—letters in black are control characters, it says, but there *aren't* any letters in black. For anyone who has encountered the same problem, here is the correct Epson code sequence: ESC, A, Control-G, ?????, ESC, K, Control-@, Control-A, ????, E. ESC represents the Escape key, commas should be ignored, and there is no space between entries. The reference card lists this sequence as the code for an Epson with Graftrax Plus; it also works with the earlier version of Graftrax.

Electronic Arts' representative admitted that these instructions left much to be desired. In a way, so does the printout, which is vertical and makes an already compressed chart even more so. Still, it is readable, and it adds greatly to the program.

All in all, Music Construction Set is a well-conceived, easy-to-use music processor. Working with it extensively, I found only one instance in which the wrong keystroke yielded an unwanted character rather than a beep, but pressing Return restored things to normal. The packaging is in the now-familiar Electronic Arts style, resembling a small record album. It contains the disk; an informative, attractively illustrated 13-page users' manual; and a six-page reference card.

I am impressed with the Music Construction Set, even with the two-voice sound of the Apple speaker (a three-voice upgrade is on the horizon), but my enthusiasm is in large measure due to the performance of the Mockingboard Sound II card. This is truly a winning combination. ✚

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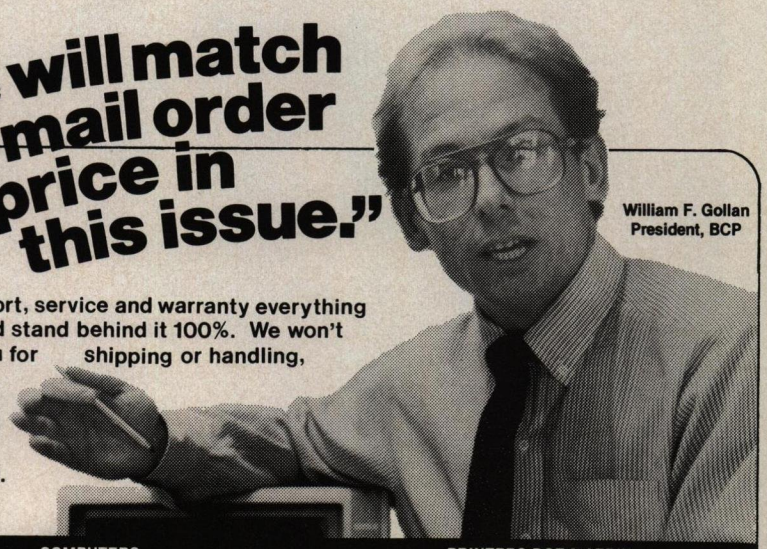

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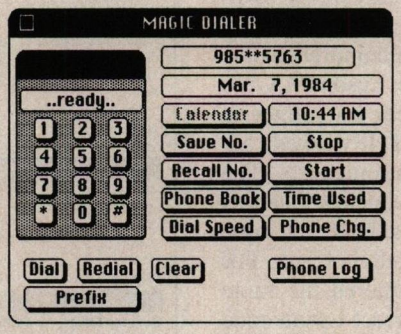

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CIRCLE 109 ON READER SERVICE CARD

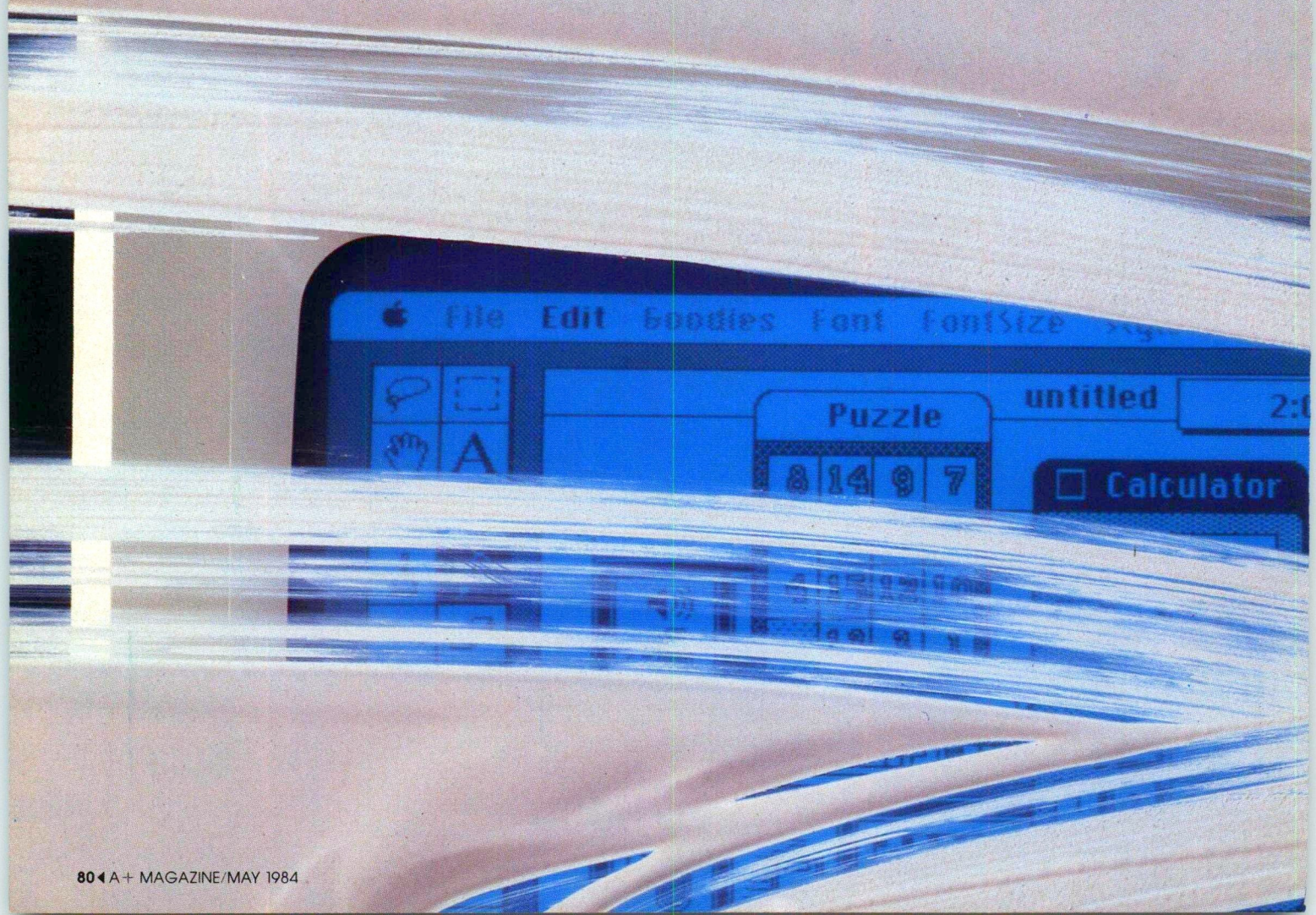
A+ NEW SECTION

Macintosh

Welcome to *A+*'s new section on the Macintosh and the Lisa, your source for information about Apple's newest personal computers. For new or potential owners or even just the curious, this new monthly section in *A+* will provide the most current and useful information possible to help you use the Macintosh and the Lisa to their fullest extent.

If you have ever tried a Macintosh, you're probably hooked; if you haven't had an opportunity to test its innovative features, take the time—it is well worth it. Like the Lisa, the Macintosh is completely different from other computers. From its small size to its mouse to its icons and windows, the Macintosh is a thoroughly intriguing product. We have three Macintoshes in the *A+* office, and I am delighted to report that everyone from secretaries to editors is clamoring to get time on one of them. We literally have to lock the "little guys" away every night to be sure no one tries to "liberate" them.

We aren't the only people who are excited about the Macintosh. In an informal survey of some of our readers,



we discovered that many of you are planning to buy a Macintosh. In order to fill your information needs on the new 32-bit product line, we are inaugurating this special section dedicated to presenting useful and interesting articles. Each month you will find tutorials and features on how to use these products effectively and software and hardware evaluations to help you make buying decisions.

To help you keep up to date on the flood of new products coming out for the Macintosh and the Lisa, we are establishing a regular feature called Pipeline, which will be a chart of new products, listing the product, company name and address, availability, and price information when possible. We have signed up Thom Hogan, author of the best-selling book *The CP/M User Guide*, to write a regular column on using the Macintosh.

Our aim is to make this section essential reading; we want to be on your desk rather than on your coffee table. Our goal is to provide you with current information on how to use your computer for professional and personal purposes. We encourage you to participate in the magazine, so please write us with suggestions and comments. We would also like to hear how you are using your Macintosh or Lisa and would appreciate any tips you have for other readers.

As with any new project, many people have made a special effort to ensure its success. I would particularly like to thank Barbara Koalkin and Lisa Van Horn of Apple Computer for responding so quickly to our equipment needs. +

Maggie Canon

DOW, CLEMENT & SIMISON

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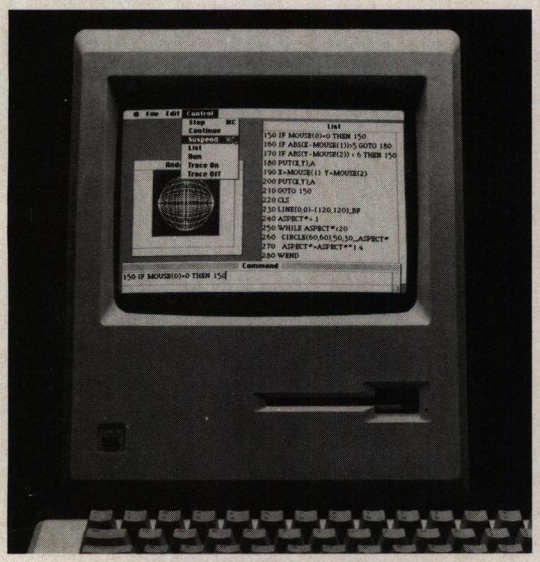

Microsoft BASIC
on Apple's new Macintosh

It's called Macintosh™. And it has our brains and a lot of our personality.

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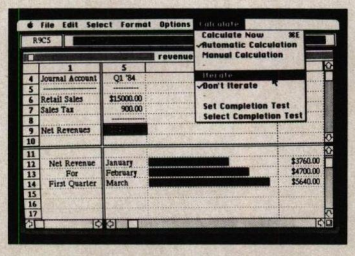
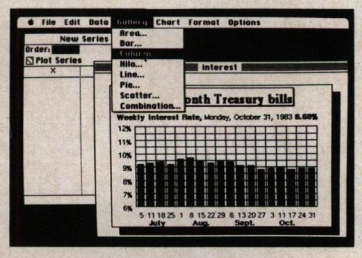
Taking advantage of Macintosh's mouse and rich graphics, we've designed software that works like you, even thinks like you.

All our programs share the same plain English commands. So what once took days to learn, now takes hours or minutes to learn with Macintosh.



Microsoft Multiplan



Microsoft Chart

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When it comes to writing, nothing travels faster

CIRCLE 320 ON READER SERVICE CARD

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than our WORD. Using the mouse, it lets you select commands faster than you can say "cheese."

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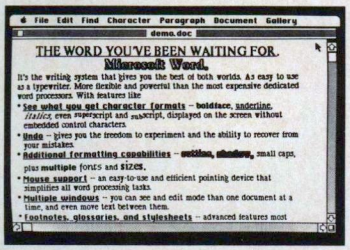
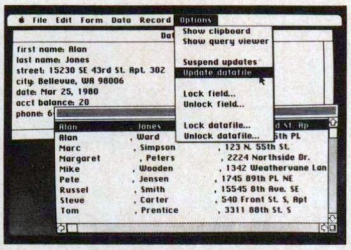


Microsoft Word



Microsoft File

We'll be adding more to the family soon. So call 800-426-9400 (in Washington State call 206-828-8088) for the name of your nearest Microsoft dealer.

THE MAC AT WORK/BY FREDERIC E. DAVIS

An introduction to Apple's word-processing program for the Macintosh

MacWrite: The Executive Memo Writer

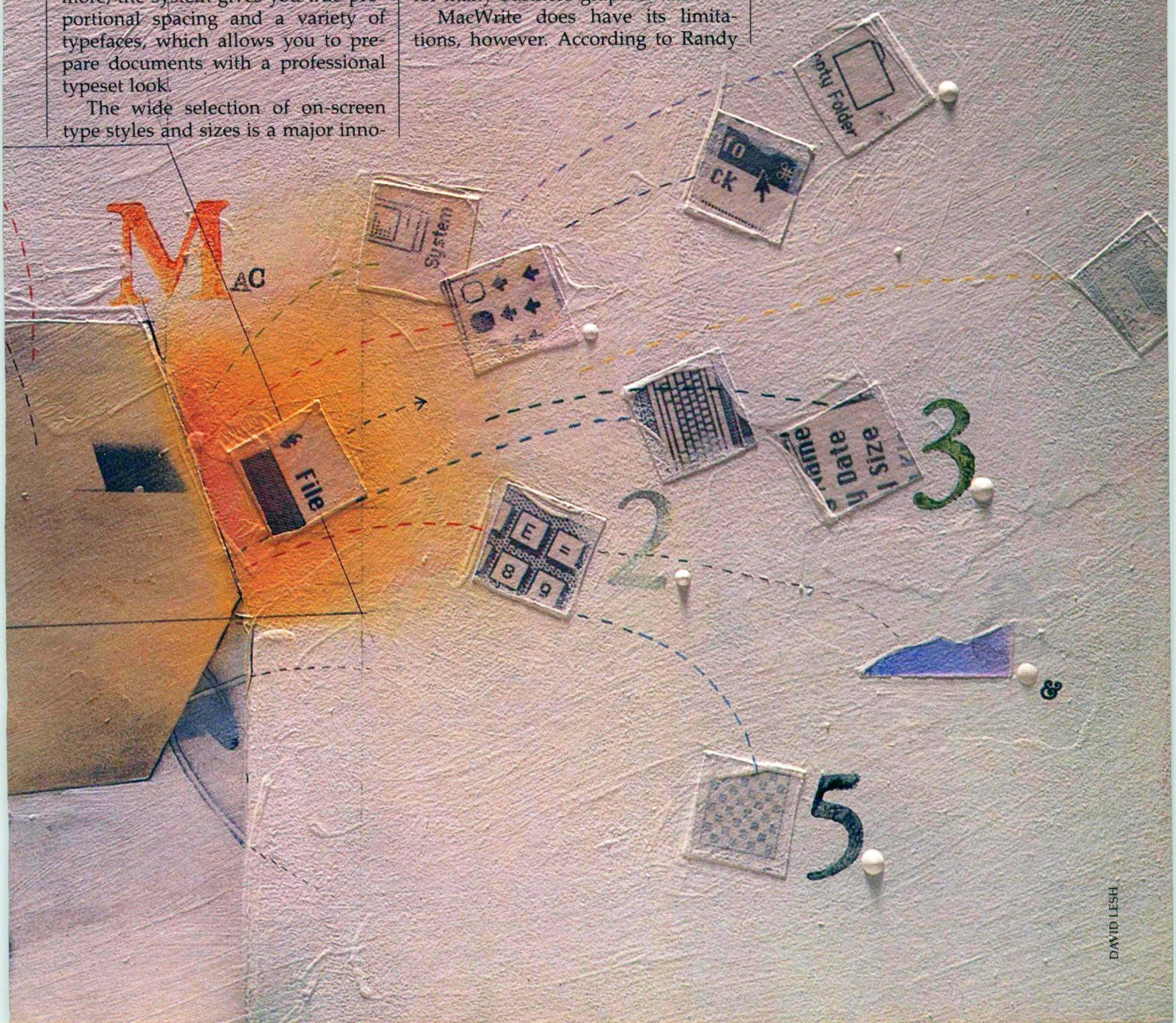
MacWrite is Apple Computer's word-processing program for the Macintosh. The program, which is flexible, powerful, and relatively easy to use, provides the Macintosh with some features previously available only on expensive dedicated word processors and business computers such as the Xerox Star

and Lisa 1, which were priced in the $10,000–30,000 range.

The most impressive features of MacWrite have to do with the way the computer displays text on the screen. The first things that you notice about MacWrite are the display, which is exceptionally crisp and clear, and the characters, which are black on a white background. This display looks like a familiar piece of paper and is easy on your eyes. Furthermore, the system gives you true proportional spacing and a variety of typefaces, which allows you to prepare documents with a professional typeset look.

The wide selection of on-screen type styles and sizes is a major innovation for a low-cost word-processing program and is not available on any other personal computer. This feature is like having an inexhaustible supply of press type for creating typeset-looking materials such as letterheads, business forms, résumés, advertising copy, handbills, flyers, bulletin-board announcements, and company reports. Although the print quality is not as sharp as with real typesetting, the look is quite good and will suffice for many business-graphics tasks.

MacWrite does have its limitations, however. According to Randy Wigginton of Encore Systems, one of the program's authors, "MacWrite was designed for writing term papers, memos, business reports, and the like. It really wasn't meant for writing books." Randy also said that Encore is working with Apple on continuous updates for MacWrite that may even



DAVID LESH

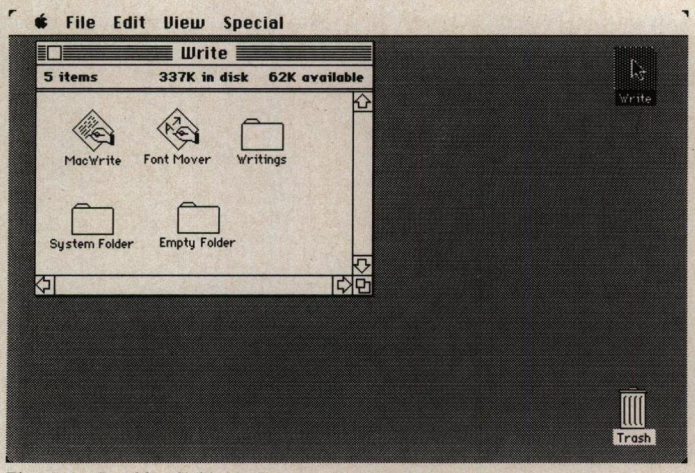


Figure 1: "Double-clicking" the mouse on the diskette icon opens the MacWrite diskette.

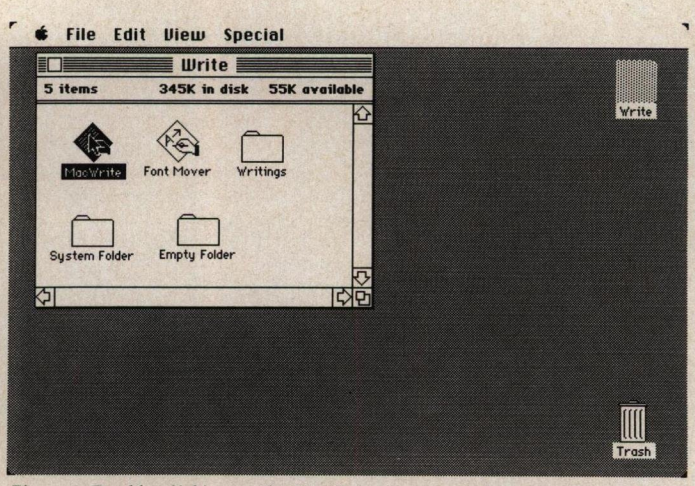


Figure 2: Double-clicking on the MacWrite icon starts the program.

include a page-layout system by the end of the year. The company seems committed to upgrading the MacWrite software and providing continuing support for the program.

Despite MacWrite's limitations, which we'll elaborate on later in this article, the program represents a major breakthrough in low-cost text editing and word processing. Not only is the program well suited for home and school use, but it also has a lot to offer businesspeople. In fact, MacWrite may be the ideal executive memo writer.

Using MacWrite

To use MacWrite effectively, you should first become familiar with the mouse cursor controller. You use it to choose commands, select sections of text, and move the cursor. Although MacWrite has alternative keyboard commands, being accustomed to operating the mouse is important if you are to get the most out of MacWrite. Some people have trouble using the mouse at first, but with a bit of practice, it becomes almost second nature.

Touch-typists and people who are used to other computer word-processing systems may find it distracting to take their hand away from the keyboard to manipulate the mouse. Once you get the hang of using it, though, you'll probably find the mouse more a help than a hindrance. Also, you use the mouse only while editing; you still do the initial typing on the keyboard. MacWrite, with its mouse, allows you to move a block of text, search and replace, scroll through a document, and perform other functions with fewer separate actions than what traditional word-processing programs such as WordStar require.

Not only should you be familiar with the mouse before using MacWrite, but you should also become familiar with the Macintosh's features and functions, such as how to control windows and how to work with files and diskettes. The Macintosh is so different from other computers that even though it is easier to learn about, you should still do the learning first. As you learn about the Macintosh, you will encounter its hidden features, such as the clipboard and desktop accessories.

The Macintosh clipboard is an imaginary clipboard where a single item that you "cut" or "copy" remains until you either "paste" it somewhere or put another item in its place. The clipboard is a temporary storage place and can hold either text or graphics.

You can reach the desktop accessories only by using the mouse to point at the small black apple in the upper right-hand corner of the screen. The desktop accessories that you may find helpful while using MacWrite are the scrapbook, notepad, calculator, clock, key caps, control panel, and puzzle. You can use all of these accessories within MacWrite. Here's a brief rundown on what these accessories are for:

Scrapbook—a permanent place to store items that you cut or copy. The scrapbook can hold up to 256 items, either text or graphics, if you have enough space on your diskette. If you try to save something created with MacWrite that contains both text and graphics in the scrapbook, only the text will be saved. The system saves text in the scrapbook in 12-point New York type. If you want to use the scrapbook to store an image with mixed type styles and sizes, or with mixed text and graphics, you must use MacPaint to create the item.

Notepad—allows you to store up to eight small pages of notes permanently.

Calculator—provides an on-screen image of a calculator for quick arithmetic calculations. You can activate the keys on the calculator by "pushing" them with the mouse or by typing the corresponding keys on the keyboard or the optional numeric keypad.

Clock—displays the time and date and sounds an alarm at any time you specify. It helps keep you from getting too caught up in your work and missing appointments and other important events.

Key caps—shows you how to generate many different special symbols at the keyboard.

Control panel—allows you to adjust computer settings for features such as keyboard touch, the rate at which keys repeat, speaker volume, distance that the mouse needs to be moved and so on. It lets you adjust the Macintosh to suit your preferences.

Puzzle—a small puzzle that is just for fun. It also helps you practice pointing with the mouse.

Now that we've introduced you to some of the Macintosh's features, let's take a look at the MacWrite program. In order to give you an idea of how MacWrite works, we'll run through a play-by-play of how to start up the program.

1. Put the MacWrite diskette in the

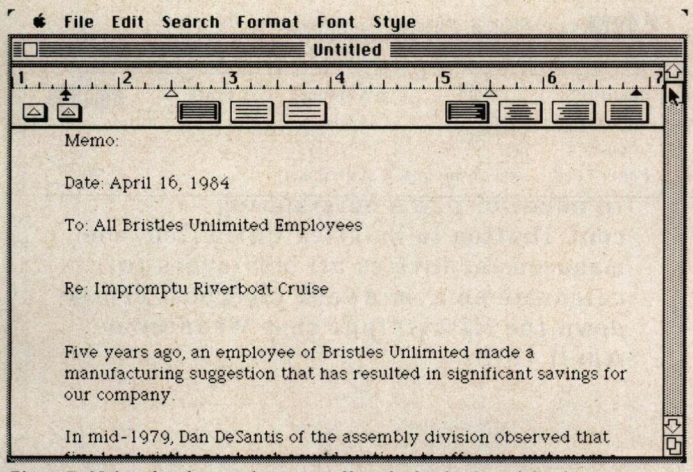


Figure 3: Using the elevator box to scroll to the beginning of the document

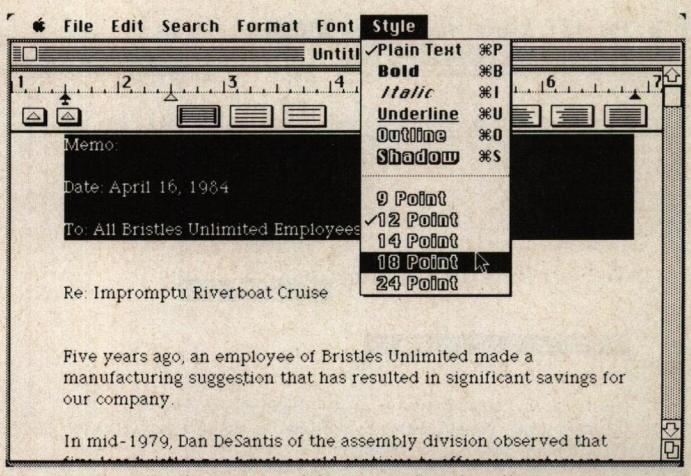


Figure 4: Changing the type size of the memo's first three lines

built-in disk drive and turn the computer on. The screen should first give you the Macintosh welcome message, and then it will display the clear desktop with icons for the diskette and the trash can. The diskette remembers what files were open, if any, when you used it last. If you left any files open, they will appear on the desktop as well.

2. With a clear desktop and a closed diskette icon, select the diskette and open it up to display its contents by pointing at it with the mouse and clicking the button twice in rapid succession ("double-clicking")—see figure 1. If the screen already shows the contents of the diskette, you can skip this step.

3. To create a new document, point at the MacWrite icon and double-click the mouse (see figure 2). You will get an untitled empty document, and you're now ready to start typing.

MacWrite, among other things, specializes in type-style options. You can select from a wide variety of fonts and type styles to create a message that actually looks like the message you're trying to get across.

In order to give you some ideas on how to use these MacWrite fonts and styles, here's an office-memo project to give you an example of what's possible. What you create is limited only by your imagination.

4. To create an office memo, type the following passage, disregarding word breaks:

```
Memo:

Date: April 16, 1984

To: All Bristles Unlimited Em-
ployees

Re: Impromptu Riverboat Cruise

Five years ago, an employee of
Bristles Unlimited made a manu-
facturing suggestion that has
resulted in significant sav-
ings for our company.

In mid-1979, Dan DeSantis of the
assembly division observed
that five fewer bristles per
brush would continue to offer
our customers a superior paint-
ing tool, while saving us a bun-
dle of money. Thanks to Dan's
insight, Bristles Unlimited
has saved $546,000.

In honor of Dan's outstanding
contribution to Bristles Un-
limited, the management in-
vites all employees to
celebrate on a midweek river-
boat cruise down the Mississip-
pi next Wednesday, April 18th.
```

5. Now move to the beginning of the document by dragging the elevator box to the top of the elevator bar (see figure 3). Next, highlight the first three lines by pointing at the beginning of the first line, pressing the button on the mouse, and holding it down while dragging the mouse to the end of the third line; then release the button. Now point at the word Style on the menu bar and select 18 Point from the Pull-down menu (see figure 4).

6. Highlight the line Re: Impromptu Riverboat Cruise by pointing at the beginning, holding the button down, dragging the mouse to the end of the line, and releasing the button. This time select 24 Point from the Style menu (see figure 5).

7. Now highlight the remainder of the memo by pointing at the beginning of the passage and holding down the mouse button while dragging the mouse to the end of the line. Next select 18 point from the Style menu and go right back to the Style menu and select Bold.

8. Finally, go to the File menu and select Print. When the Print menu appears, press the OK button by pointing at it and clicking with the mouse (see figure 6). The printed memo should now look like the reduced version depicted in figure 7.

Again, you can select from a wide variety of type fonts on the Font menu and combine the fonts with some of the other type styles from the Style menu.

Limitations of MacWrite

Macwrite does have its limitations. The program is not really a full-featured word processor suitable for writing a book or a doctoral dissertation, for example. MacWrite is best suited to writing relatively short memos and reports.

One of the most restricting limitations of the program is that it can hold a maximum of only 8½ single-spaced pages of text (assuming one-inch margins at the top and bottom). MacWrite can hold only this much at one time because the entire document is stored in the computer's active memory (RAM) and is saved to the diskette only when you are done working. Although keeping the entire document in active memory limits the size of the document, it does en-

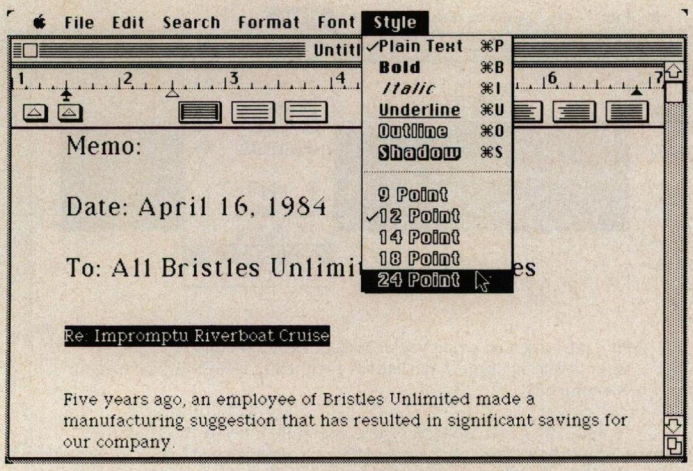


Figure 5: Changing the type size of the memo's fourth line

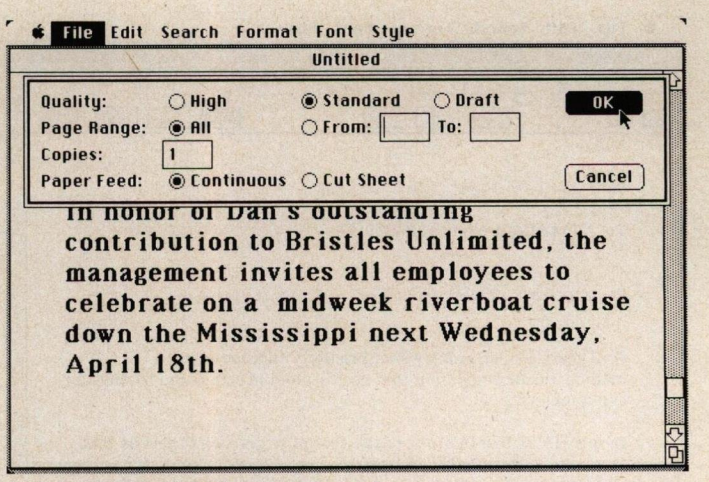


Figure 6: Pressing the OK button to print the memo

able you to reformat entire documents with lightning-fast speed. Also, MacWrite does have a provision for linking documents when you print, so you can create longer documents with consecutive page numbers.

Another limitation is that you cannot view an entire page at once. You must scroll up and down within your document, and there are restrictions on the left and right margins. The minimum left margin is at 1 inch and the maximum right margin is at 7⅞ inches.

Other drawbacks are that the program does not support hyphenation, and it has no built-in spelling dictionary. If you are looking for a word-processing system for the Macintosh that offers more features, you should consider other programs such as Microsoft's Word. If most of your writing is memos, reports, and documents under 40 pages long, however, then MacWrite is an excellent writing tool. ✚

Memo:

Date: April 16, 1984

To: All Bristles Unlimited Employees

Re: Impromptu Riverboat Cruise

Five years ago, an employee of Bristles Unlimited made a manufacturing suggestion that has resulted in significant savings for our company.

In mid-1979, Dan DeSantis of the assembly division observed that five less bristles per brush would continue to offer our customers a superior painting tool while saving us a bundle of money. Thanks to Dan's insight, Bristles Unlimited has saved $546,000.

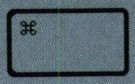
In honor of Dan's outstanding contribution to Bristles Unlimited, the management invites all employees to celebrate on a midweek riverboat cruise down the Mississippi next Wednesday, April 18th.

Figure 7: Reduced version of the printed memo

Shortcuts

If you're the kind of writer who hates to lift your fingers from the keyboard to initiate commands with the mouse, there's good news. You can issue several of the most common editing commands directly from the keyboard.

You activate these keyboard commands by pressing the command key in combination with other keys. Here is a drawing of the Command key that I created using MacPaint, copied to the clipboard, saved in the scrapbook, and then pasted into the MacWrite document.



Command-X
Cut (removes highlighted area and saves it on the clipboard)
Command-C
Copy (saves copy of highlighted area on the clipboard)
Command-V
Paste (transfers what's on the clipboard to the screen)
Command-Z
Undo Last Action (lets you undo whatever you just did—this command can be a real lifesaver)
Command-.
Stops current process (such as printing)

Since you may wish to change type styles while you are typing, the program offers several command-key shortcuts for type-style changes.

Command-P	Plain text
Command-B	Boldface
Command-I	Italics
Command-U	Underline
Command-O	Outline
Command-S	Shadow

Some other shortcut techniques require three or more keys to be pressed simultaneously:

Command-Shift-1
Ejects the diskette located in the internal drive
Command-Shift-2
Ejects the diskette located in the external drive (if you have an optional drive)
Command-Shift-3
Takes a "snapshot" of the screen and saves it as a MacPaint document
Command-Shift-4
Prints the contents of the active window only
Command-Shift-4-Caps Lock
Prints the contents of the entire screen

A shortcut for transferring groups of documents is to place them all in a folder and then transfer the folder. This method really speeds up file transfers with a single-drive system and can significantly cut down the number of diskette swaps necessary.

New products for the Macintosh are proliferating at an increasing rate.

The Magicphone

Hardly a day goes by that we don't hear of another hardware or software item for the Mac. One especially innovative product is the MAGICphone from Artsci of North Hollywood, California. The MAGICphone is a hardware/software product that combines a telephone handset with a Macintosh program for using the phone.

The hardware part of MAGICphone is a rectangular box with a removable telephone handset that mounts on the side of the Macintosh or on a nearby wall. The unit connects to the Macintosh via the Mac's audio-output connector. The Mac's internal sound synthesizer creates the tones a touch-tone phone uses for dialing telephone numbers or the codes companies such as MCI and Sprint use.

You can use the MAGICphone as an ordinary telephone when the computer is turned off, or you can control it through software when the computer is on.

The MAGICphone software consists of four main parts. (1) The "dialer" icon looks like the keypad on a touch-tone phone, to dial a number, you point to the number and click the mouse. (2) The dialing and phone-directory program has a mini database for storing and retrieving phone numbers. The directory allows you to sort the list, select a number to be called, and redial the number if the line is busy or not answered. (3) The software includes an appointment calendar, and (4) a clock/calendar lets you time and keep track of your calls.

The MAGICphone can access two different telephone lines and provides a "hold" feature for making full use of a second line.

Products such as the MAGICphone are a good example of how warmly the Macintosh is being received by software and hardware developers. You can look forward to seeing many other new Macintosh products featured in *A+* in the coming months. +

PRODUCT INFORMATION

MAGICphone
Artsci
5547 Satsuma Avenue
North Hollywood, CA 91601
(213) 985-2922
List Price: $199.95
Required: Macintosh

JIM SADLON

The Scrapbook and Clip Art

Collecting predrawn images is easy with the Macintosh scrapbook.

One subject that isn't covered well in the Apple manuals is the scrapbook. Ideally, the scrapbook should serve as a graphic "boilerplate" facility. You store often-used phrases and images in the scrapbook and retrieve them at will to paste into your text or drawing.

The scrapbook is quite different from the clipboard facility on the Macintosh desktop. The clipboard can contain only one object of each data type (initially one graphic image and/or one text sample) at a time. The clipboard comes in most handy when you have to move information between MacPaint and MacWrite. For instance, in last month's installment, I suggested that you create a logo using MacPaint, copy it to the clipboard (by using the Cut option on the Edit pull-down menu), leave MacPaint, start MacWrite, and then move the logo from the clipboard to the text page by using the Paste option on the Edit pull-down menu.

That's all fine, but what if you want to use the logo for lots of documents? Having to get the logo onto the clipboard from MacPaint each time you want to use it (or refrain from using the clipboard for anything else) can become downright annoying.

Fortunately, the scrapbook comes to the rescue. To move something from MacPaint or MacWrite to the scrapbook, you first put the item in question into the Paste buffer (clipboard). Next, select the Scrapbook function from the Apple pull-down menu. With the scrapbook displayed on the screen, pull down the Edit menu and select the Paste function.

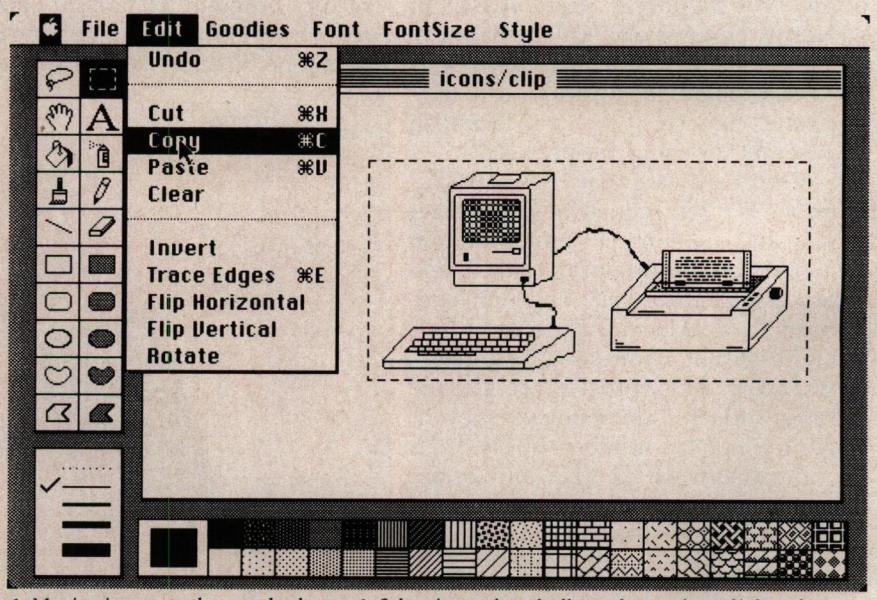


Figure 1: Moving images to the scrapbook, step 1: Select image from buffer and move it to clipboard.

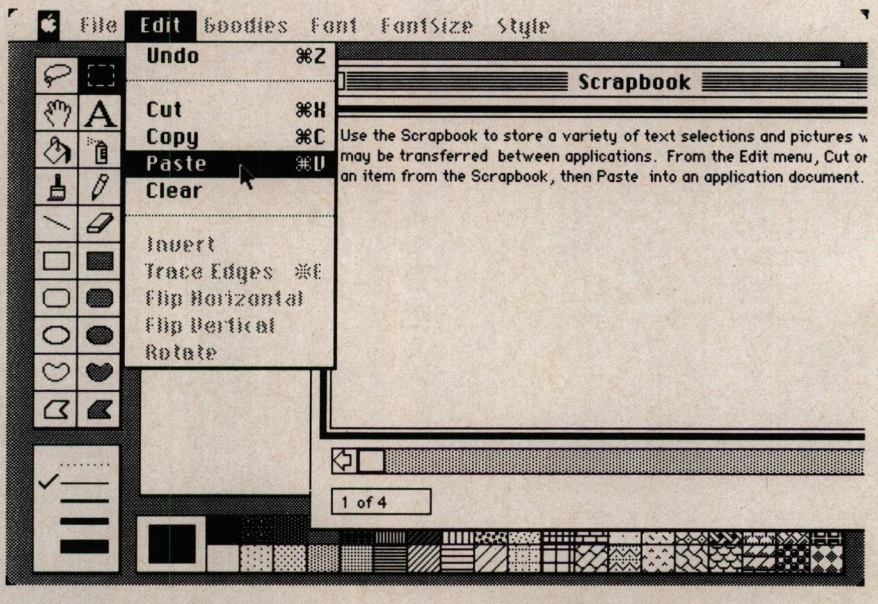


Figure 2: Moving images to the scrapbook, step 2: Paste from clipboard to scrapbook.

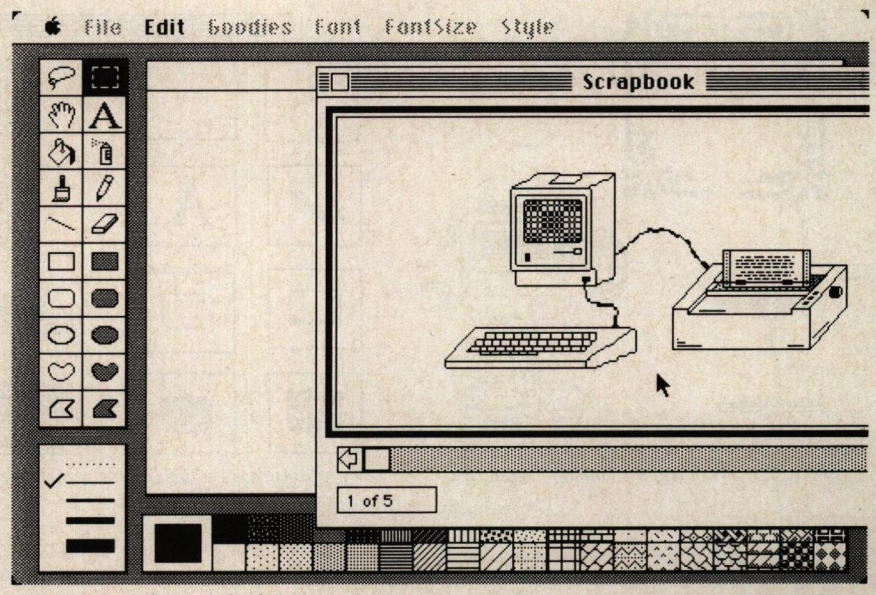


Figure 3: Item is copied to scrapbook.

The item in the Paste buffer will be copied to the scrapbook (see figures 1–3 for an example).

To move something from the scrapbook to the page you're creating (editing), move the scrapbook display on the screen to the selection you desire (use the scroll bar at the bottom to move from item to item), pull down the Edit menu, and select the Copy function. The clipboard now contains the scrapbook image. (Figure 4 shows this process.)

To remove something from the scrapbook, have the scrapbook and the appropriate selection displayed on the screen, pull down the Edit menu, and select the Cut function (see figure 5).

Unfortunately, the scrapbook items are stored as graphic images in a disk file, which means that you have a theoretical and a practical limit on the number of items you can store in your scrapbook. The theoretical limit is the disk capacity that remains after you take the program and system files into account. The practical limit is something far short of this, since you need space for the document you're working on and the desktop icons. I've found that five to ten items in my scrapbook are usually about the right number. (I keep different scrapbooks for each diskette—my MacPaint diskette contains predrawn objects, and my MacWrite diskette contains some boilerplate text.)

Apple provides some items in the

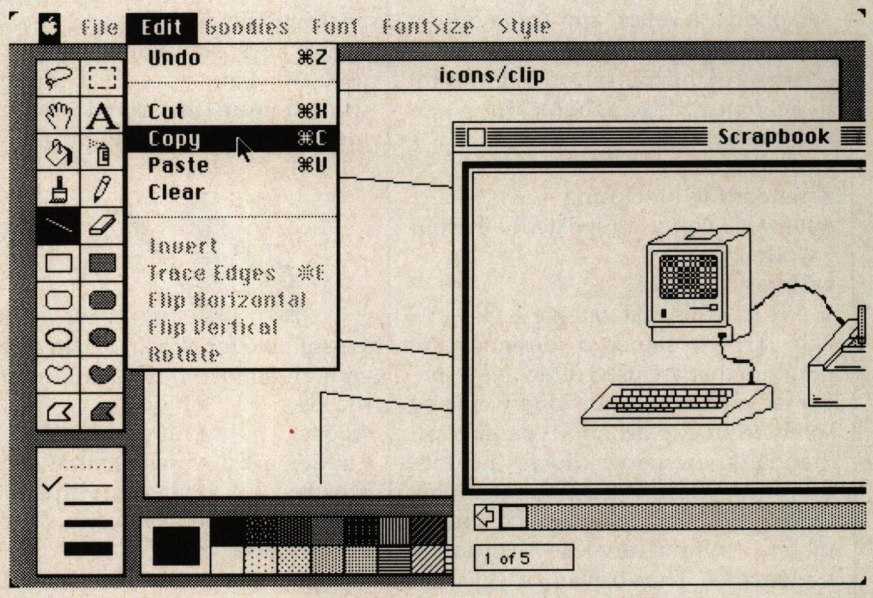


Figure 4: Copying image from scrapbook to clipboard

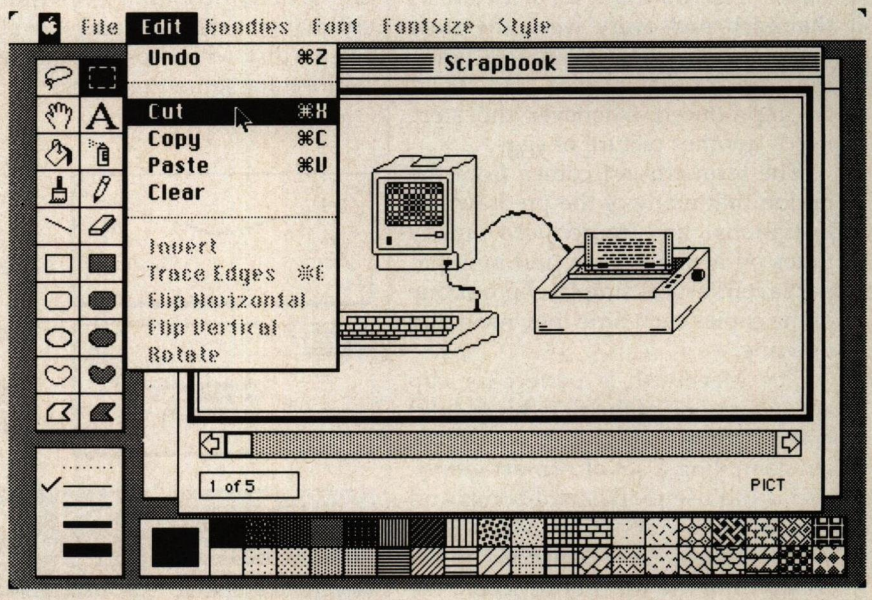


Figure 5: Removing image from scrapbook

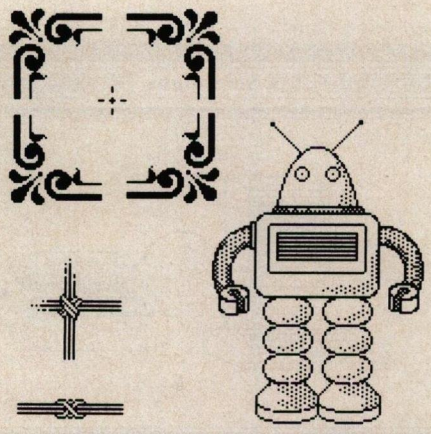


Figure 6: Items in Apple's standard scrapbook

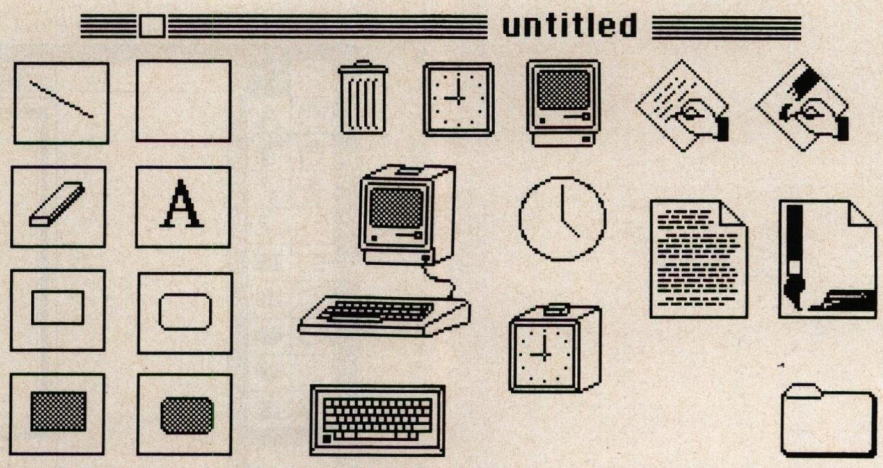


Figure 7: Author's scrapbook file containing Macintosh icons

scrapbook that comes with the MacWrite and MacPaint disk. I found a text note on the disk describing the scrapbook, a robot, and some border details (see figure 6).

Some of the things you might want to keep in your scrapbook are

- company logo
- your name and address
- standard letter closing
- symbols you use repeatedly in your work
- clip art

What's this last category, clip art? Clip art is standard designs and graphics that are used often. Newspaper advertisments are often created solely from clip art and typeset copy. Standard newspaper clip art includes everything from 100 different graphic "sale" announcements, to automobile silhouettes, to corporate trademarks. That basket of eggs the local supermarket advertises, for instance. Do you think an artist draws that each and every week the store has a sale on eggs? Of course not—the eggs are drawn once, and copies are reproduced whenever the store needs another picture of eggs.

The term *clip art* comes from the notion that many of the predrawn illustrations are reproduced many times on a single page, and newspaper layout artists simply clip out one of the copies each time they need that drawing.

The Macintosh is perfect for clip art. In fact, one of the first things I did when I got my Macintosh was to begin compiling a set of clip-art graphics I could use to illustrate books and articles I wrote about the Macintosh.

An obvious candidate for clip art was for me the Macintosh icons: the disk icon, the program icon, even the Macintosh's own icon (see figure 7). I started collecting icons by first saving a screen that contained them (by pressing the Shift, 3, and the Command keys simultaneously). I then used MacPaint to extract the icons I wanted from the saved screen and moved them to my clip-art file.

What types of images are suitable for clip art? I can come up with an almost inexhaustible list:

- icons
- signs
- trademarks
- logos
- borders
- body parts
- maps
- tools
- music symbols
- architectural symbols
- alternate alphabets
- decks of cards, dice
- flags
- often-used drawings

Once I'd started putting together a clip-art file, I couldn't stop. Indeed, I still haven't stopped, and I've almost filled a disk with clip-art material (see figure 8 for some examples).

As you assemble your clip-art collection, don't forget that MacPaint has some handy rotation and flipping facilities. Rather than creating all four corners of a fancy border, just make one and use MacPaint's flip functions to make the other three. That's why only one corner appears in the Apple scrapbook. Move this corner to your illustration, select it, and make three other copies of it (by holding down the Option key while moving the mouse). Next, select each corner and flip it to the right orientation. Last, use the lasso to move the corners into the proper position.

Apple has indicated that it might provide a disk full of clip art in the future, but I'll get the ball rolling right away. I've collected a disk full of copyright-free clip art, which I'll make available at a low fee (about $20, my cost of copying, shipping, etc.) to *A+* readers. If you're interested, drop me a line, care of *A+*, and I'll send you the information on how to obtain your copy.

The more ambitious among you

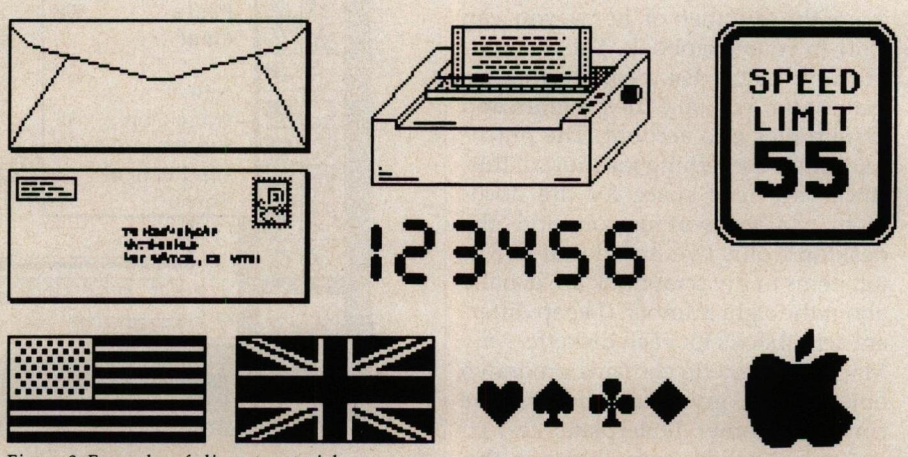


Figure 8: Examples of clip-art material

could consider a clip-art project. Spend 20 minutes a day during the next month drawing commonly found symbols and graphics with your Macintosh. If you're at a loss about where to start, you might want to check out some graphics-reproduction books. Dover Publications puts out a series of "Ready-to-Use" clip-art books:

- *Ready-to-Use Arrows*
- *Ready-to-Use Headlines*
- *Ready-to-Use Borders*
- *Ready-to-Use Floral Designs*
- *Ready-to-Use Christmas Designs*
- *Ready-to-Use Banners*
- *Ready-to-Use Illustrations of Hands*
- *Ready-to-Use Illustrations of Men's Heads*
- *Ready-to-Use Illustrations of Children*
- *Ready-to-Use Sports Illustrations*

Although many of the drawings in these books are dated, they are a good source for getting clip-art ideas. At $2.95 a book, they are a bargain source of creative ideas, even though I drew only a few of their illustrations for my clip-art files.

The nice thing about having a clip-art disk handy is that you'll produce more creative illustrations in far less time than if you worked completely from scratch. If I were writing about how to program blackjack in Macintosh BASIC, I'd first load my clip-art disk and transfer some card images into my scrapbook before I started writing. I'm sure that you'll be able to find similar uses for clip art.

Since this column appears a couple of months after I write it, a fair amount of Macintosh software should be available by the time you read this. For starters, you should be able to purchase

- Microsoft BASIC
- Multiplan
- Microsoft Chart
- PFS:File
- PFS:Report
- ThinkTank

If these products aren't already available, don't despair; I've seen preliminary copies of them, and they should be available soon.

Next time I'll introduce you to some of these non-Apple software programs and show you how different the same program can be on a Macintosh and, say, an IBM Personal Computer. Until then, remember to work on your clip-art collection! ✚

A Love Letter to My Macintosh

My dearest Mac,

It seems appropriate that I'm writing this love letter on Valentine's day. The last three months have been a great experience for me, especially after the bad times I've had with other computers.

Like every love, you have your share of faults, though. I don't want you to think what I'm going to say diminishes my feelings toward you in any way—I tell you these things so that you can become perfect, unmatched by any other computer.

I have to start my list of your faults with a description of your physical shortcomings. Despite your promises to the contrary, 128K of memory and 400K of disk space are not quite enough for me. Couldn't you go on a memory-development regimen and increase those sizes a bit? Somehow, four disk changes just to move a picture to another diskette take some of the fun out of being with you. I'll meet anything you can do to address this problem with unbridled excitement.

Other minor physical grievances that occur to me are the noisiness of your keyboard (clack, clack, clack is not exactly an endearing sound to us humans), and I really do wish that you had an external video jack so that I could show you off to larger groups of friends. Your connectors stick out a bit too far, which makes you look a tad awkward, but it's nothing to be ashamed of.

The cord to the mouse is probably your most inflexible part; it should yield more readily to my (mouse) advances. After being cooped up in your Mac Pack for a long trip, your mouse cable has a distinct tendency to run in circles.

Your most glaring deficiencies are in your software, though, Mac. Although you excel where others don't even shine, you could still use some polishing.

Take MacWrite, for instance. It's billed as a word processor, but I'd have to rate it several notches lower—more like a quick-and-dirty letter maker. Sure, changing fonts is a new experience, but why don't you have the ability to create form letters easily? Why can't I stick words into the middle of a picture? Why must I use the mouse simply to move the cursor back one word? Why do I have to use the mouse and pull down a menu to erase a word? Can't you help me with my spellin' and grammar? How about a transpose function?

MacPaint is great. In fact, I find that I can't stop playing with your MacPaint. Yet, even here, there is room for improvement.

Why can't I move portions of a drawing around on the Show Page screen? Why doesn't FatBits scroll automatically when my pen moves to the edge? Can't I have multiple sizes of erasers? And how about a user-selectable grid? For true artists, a bigger drawing area would be helpful, even if it meant shrinking the display or using slightly more convoluted menu-selection arrangements.

While I'm at it, how about real page-pasteup abilities for MacPaint? You'd have to add several features to the program, but not *that* many. A two-page display (side-by-side) would be nice, too, since I often work with a spread.

Other software that works on you has its problems, too. Multiplan from Microsoft, for instance, has the most annoying insert-row-or-column function I can imagine, especially considering how easy it is to remember all your other commands. Why should I have to remember to press the Shift key and the mouse key at the same time? Seems like an unnatural act to me, especially considering how often I use the Insert function.

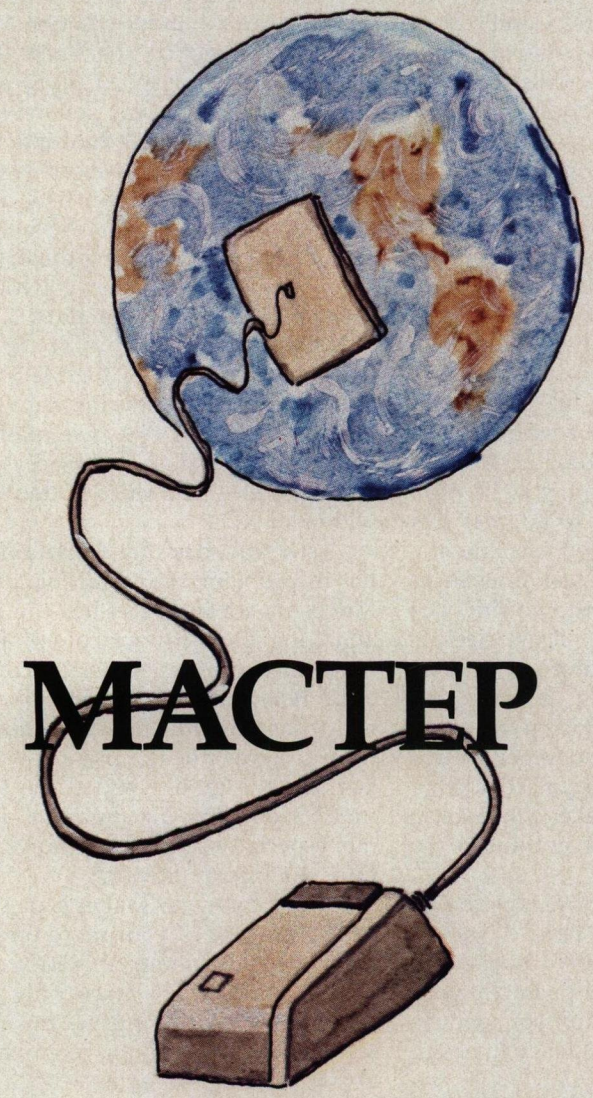
I know that your Maker is working on fixing some of your more obvious faults (such as coming up with a disk-copy function that takes only four swaps instead of umpteen), but don't let that make you too complacent about other improvements.

Our relationship should last a long time. Already I'm writing a book dedicated to you, and some of my friends and I are putting together a dynamite program for you to use. In short, dearest, I love you like no other computer.

I know I can be demanding sometimes, but we can work our problems out together by just communicating clearly with one another.

Hugs and kisses (and a little tap on your keyboard)

Tom



MACTEP

Teach your Macintosh to communicate with the whole world.

MARY ROSS

An *A+* exclusive! The MACTEP terminal-emulation program will let you use your Macintosh and a 300-bps modem to talk to CompuServe; The Source; MCI; another Macintosh; or another computer, such as the IBM Personal Computer.

It takes less than an hour to type in this program, using Microsoft BASIC. Next month, we'll run complete instructions on how to use this version to download an even more advanced copy, complete with error checking, speed control, and full annotation.

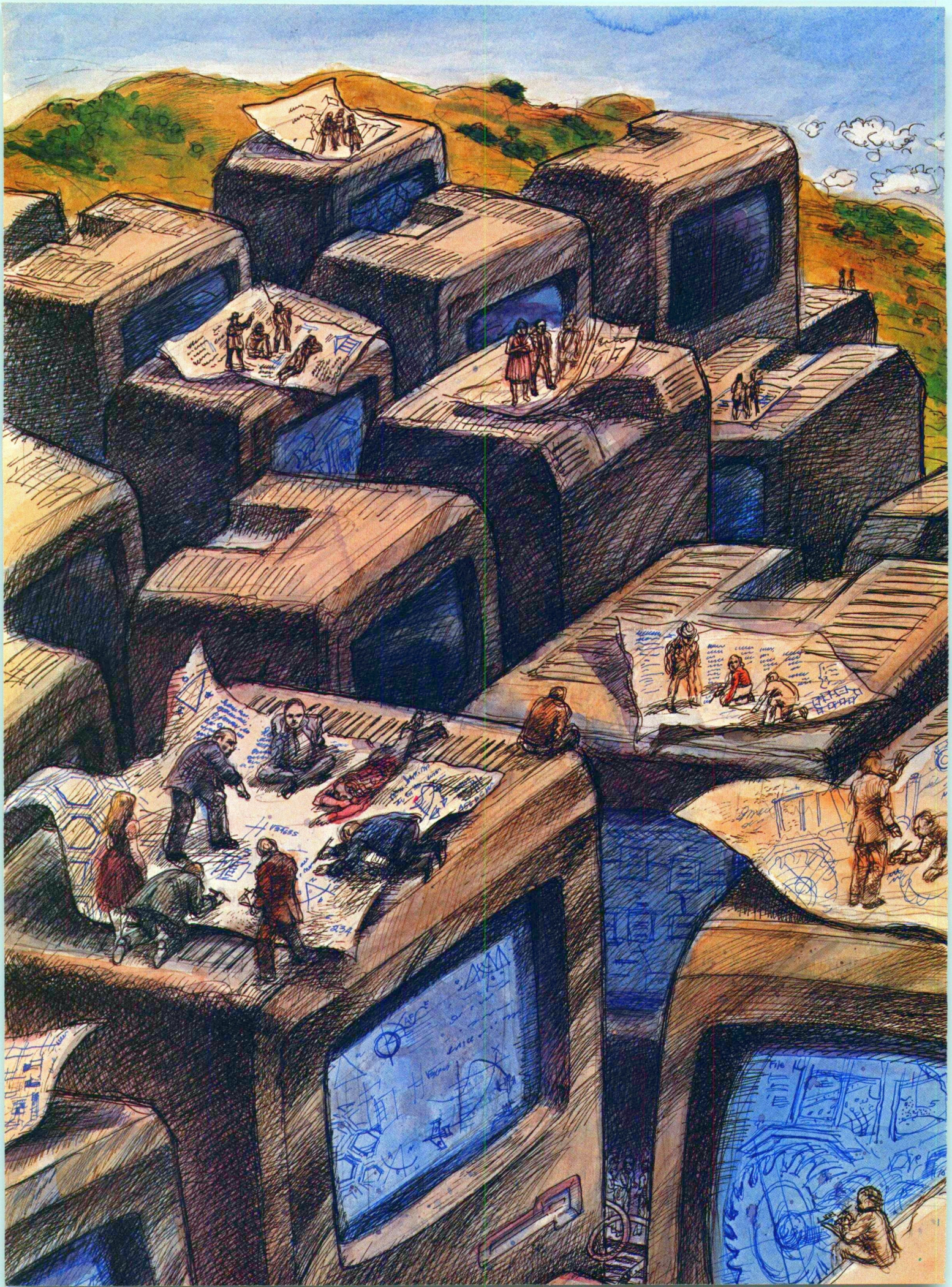
Note: To connect a modem to your Macintosh, wire a cable as follows:

Macintosh RS-422 Modem Port		DB-25, RS-232 Modem-Cable Connector
Pin 3	⟷	Pin 7
Pin 5	⟷	Pin 2
Pin 8	⟷	Pin 1
Pin 9	⟷	Pin 3

To edit captured files, use BASIC to append them onto an existing MacWrite document.

```
1000 CLS: PRINT "MacTEP - Version 1.40 ";
1010 PRINT "Macintosh Terminal Emulator ";
1015 PRINT "Program"
1017 PRINT "Dennis F. Brothers - 28-Feb-84"
1018 PRINT "Compuserve ID [70065,172]"
1020 PRINT "Copyright (c) 1984 Brothers ";
1025 PRINT "Associates, Wayland MA"
1030 PRINT "Permission is hereby granted ";
1032 PRINT "for personal, non-commercial"
1040 PRINT "reproduction and use of this ";
1045 PRINT "program, provided this notice"
1047 PRINT "is included in any copy."
1050 PRINT : PRINT "Special bootstrap ";
1060 PRINT "version for A+ Magazine -";
1062 PRINT "300 baud only, no protocols"
1080 '
1100 ' Define constants
1150 DEFINT A-Z: ' Use integers for speed
1170 FALSE=0: TRUE=-1 : BUFLIM =32
1190 LF=10: LF$=CHR$(LF)
1200 CR=13: CR$=CHR$(CR)
1210 XON=17: XON$=CHR$(XON)
1220 XOFF=19: XOFF$=CHR$(XOFF)
1240 CMDB=2: CMDB$=CHR$(CMDB)
1250 CMDE=5: CMDE$=CHR$(CMDE)
1260 CMDR=18: CMDR$=CHR$(CMDR)
1270 CMDT=20: CMDT$=CHR$(CMDT)
1280 '
2000 ' Display instructions
2020 CALL TEXTSIZE(9): CALL TEXTFONT(4)
2060 PRINT " CMD-E exits to the desktop."
2080 PRINT " CMD-R starts and stops ";
2085 PRINT "ASCII receive (download)."
2086 PRINT " CMD-T starts and stops ";
2088 PRINT "ASCII transmit (upload)."
2090 PRINT " CMD-B starts/stops BASIC ";
2095 PRINT "[in ASCII form] receive"
2100 PRINT " (lines not beginning with"
2105 PRINT " a digit are ignored)."
```

```
2110 PRINT: PRINT
2120 '
2130 'Open the COM1 port, set the baud rate
2150 OPEN "COM1: " AS #1 'modem port -> #1
2160 GOSUB 9000 'set serial baud rate
2170 PRINT
2180 '
3000 PRINT "- terminal mode - "
3010 '
3060 WHILE LOC(1)
>0 'if rec'd char ready
3070 C=ASC(INPUT$(1,1)) AND &H7F 'get char
3080 IF C
>LF THEN PRINT CHR$(C);
3090 WEND
3100 C$=INKEY$ 'check keyboard
3110 IF C$="" THEN GOTO 3060 'skip if none
3120 IF C$=CMDE$ THEN 3500 'exit
3130 IF C$=CMDB$ THEN BMODE=TRUE: GOTO 5000
3140 IF C$=CMDR$ THEN BMODE=0: GOTO 5000
3150 IF C$=CMDT$ THEN GOTO 6000 'send file
3160 PRINT #1,C$; 'if not command, send it
3170 GOTO 3060 'go back for more
3190 '
3500 PRINT: PRINT "Exiting by user request"
3510 PRINT : SYSTEM
3520 '
5000 PRINT: PRINT "Receive file: ": PRINT
5020 PRINT: LINE INPUT "File Name: ",F$
5025 IF F$="" THEN GOTO 3000 'skip if none
5030 OPEN F$ FOR OUTPUT AS #2 'make file
5040 L$="" 'start with empty line
5050 WHILE F$
>"" 'do until name erased
5060 WHILE LOC(1)
>0 'do if char received
5080 C=ASC(INPUT$(1,1)) AND &H7F
5090 IF C=LF THEN GOTO 5170 'skip lf's
5100 PRINT CHR$(C);
5110 IF C=CR THEN 5130
5120 L$=L$+CHR$(C): GOTO 5170
5130 IF NOT BMODE THEN 5150
5132 'skip if doesn't start with digit
5135 IF L$="" THEN 5170
5135 C$=LEFT$(L$,1)
5140 IF (C$
"0") OR (C$>"9") THEN 5170
5150 'tell sender wait, save line to disk
5155 PRINT #1,XOFF$;: PRINT #2,L$
5160 PRINT #1,XON$;: L$=""
5170 WEND
5180 'stop if CMD-R or CMD-B from keyboard
5190 C$=INKEY$: IF C$="" THEN GOTO 5250
5210 IF C$
>CMDB$ AND C$
>CMDR$ THEN 5250
5220 CLOSE #2
5230 PRINT: PRINT "Receive Ended": PRINT
5240 F$="" : GOTO 5260 'mark all done
5250 PRINT #1,C$; 'if not done, send char
5260 WEND 'done when no file name
5270 GOTO 3000 'back to terminal mode
5280 '
6000 ' Transmit (upload) ASCII file
6010 PRINT: PRINT " - transmit a file - "
6020 LINE INPUT "Transmit File Name: ",F$
6030 IF F$="" THEN GOTO 3000 'skip if none
6040 OPEN F$ FOR INPUT AS #2 'open file
6050 I=1: LL=0 'Initialize values
6060 XFLAG=FALSE: DLY=FALSE: QUIT=FALSE
6065 'do until last line sent or abort
6070 WHILE NOT ((EOF(2) AND I>LL) OR QUIT)
6080 WHILE LOC(1)
>0 'if char received
6090 IF LOC(1)
= BUFLIM THEN 6100
6095 PRINT #1,XOFF$;: XFLAG=TRUE
6100 C=ASC(INPUT$(1,1)) AND &H7F
6110 IF C=LF THEN GOTO 6150
6120 IF C=XOFF THEN DLY=TRUE: GOTO 6150
6130 IF C=XON THEN DLY=FALSE: GOTO 6150
6140 PRINT CHR$(C);'if ordinary, print it
6150 WEND 'done with received char
6160 IF NOT XFLAG THEN 6170 'if sent x-off
6165 XFLAG=FALSE: PRINT #1,XON$;
6170 IF DLY THEN GOTO 6250 'if wait, ck kb
6180 IF I
=LL THEN GOTO 6230 'ck line end
6190 PRINT #1,XOFF$; 'line end, stop host
6200 LINE INPUT #2,L$ 'get another line
6210 I=0: LL=LEN(L$) ' set count, length
6220 PRINT #1,XON$; 'start host again
6230 IF I
> LL THEN 6240 'if before end
6235 PRINT #1,CR$;: I=I+1: GOTO 6250
6240 I=I+1: PRINT #1,MID$(L$,I,1);
6250 C$=INKEY$ 'ck keyboard
6260 IF C$="" THEN GOTO 6290
6270 IF C$=CMDT$ THEN QUIT=TRUE: GOTO 6290
6280 PRINT #1,C$; 'if not halt, send it
6290 WEND
6300 CLOSE #2 'close the transmit file
6310 PRINT: PRINT "Transmit Ended": PRINT
6320 GOTO 3000 'go back to terminal mode
6330 '
9000 ' Subroutine to set COM1 baud rate
9040 DIM ML(50) 'array for machine code
9050 I=0
9060 READ A: ML(I)=A 'read data into array
9070 I=I+1 'point to next
9080 IF A
>-1 THEN GOTO 9060 '-1 is end
9110 '
9120 BR=300 'baud fixed at 300
9130 TC=(115200!/BR)-2 'counter value
9140 TCH=INT(TC/256) 'high byte
9150 TCL=TC MOD 256 'low byte
9160 R=12: X=TCL: WSCCB!=VARPTR(ML(0))
9165 CALL WSCCB!(R,X) 'low byte to reg 12
9170 R=13: X=TCH: WSCCB!=VARPTR(ML(0))
9175 CALL WSCCB!(R,X) 'hi byte to reg 13
9180 RETURN
9190 '
9200 'machine language code to set speed
9210 ' saves state, sends baud rate to
9220 ' SCC chip, restores and returns
9250 DATA &H4E56,&H0000,&H1D6E,&H000B
9260 DATA &H000A,&H422E,&H000B,&H1D6E
9270 DATA &H0009,&H0008,&H422E,&H0009
9350 DATA &H007C,&H0700,&H33EE,&H000A
9360 DATA &H00B0,&H0002,&H33EE,&H0008
9370 DATA &H00B0,&H0002,&H027C,&HF8FF
9430 DATA &H4E5E,&H4E75
9470 DATA -1
```



Sending the Macintosh to College

The path to a college education will soon be paved with Apple computers.

That's what Apple Computer hopes, now that it has launched its recently announced Apple University Consortium, amid cheers from educators and jeers from dealers.

Much as it "seeded" software companies with Macintosh technology, Apple has now sown 24 universities and colleges with the rights to purchase Apple products—mostly Lisas and Macintoshes—at greatly reduced rates.

The company anticipates that by the end of 1984, at least 50,000 Macintosh computers will have found homes on college campuses nationwide as a result of the program. Apple says participating schools have committed over $60 million to the Mac.

Only full-time faculty, students, and staff will be allowed to take advantage of the discount, which runs at approximately 50% off list price at most schools. In return, hopes Apple, the schools will gush forth with a flood of Apple-compatible courseware and applications, perhaps even a blockbuster like VisiCalc.

The Apple University Consortium is the brainchild of Dan'l Lewin, college marketing manager at Apple. Late in 1982, Lewin says, the company realized that many universities were on the verge of making major commitments to microcomputers. Although universities were still purchasing the Apple II in reasonable quantities, Apple noted that no one was considering the product for large-volume standardization.

"The fundamental reason for doing it was that we looked at history," says Lewin. For instance, in the late 70s, Apple had worked very closely with the Minnesota Educational Computing Consortium. "MECC did an incredible amount of courseware on the Apple II. It has since fostered Apple II's entry into every conceivable school—we even found MECC courseware in a schoolhouse in Nairobi."

Lewin, who singlehandedly put the program together, decided which universities to invite to participate in the consortium, based on which ones had already made "reasonable commitments to Apple products." He chose 24 as the largest number of colleges with which Apple could comfortably sustain a close working relationship.

The members of the consortium include Boston College, Brigham Young University, Brown University, Carnegie-Mellon University, City University of New York, Columbia University, Cornell University, Dartmouth College, Drexel University, Harvard University, Northwestern University, Princeton University, Reed College, Rice University, Stanford University, University of Chicago, University of Michigan, University of Notre Dame, University of Pennsylvania, University of Rochester, University of Texas (Austin), University of Utah, University of Washington, and Yale University.

Lewin aimed for a cross section of the market, from small private institutions such as Reed to large public institutions such as the University of Michigan.

Because Apple couldn't announce the program while the Macintosh was still under wraps, he says, "we missed a lot of good schools that had plans in place." Lewin says other programs are in the offing, although the consortium won't be expanded.

Under the terms of the agreement with Apple, members of the Apple Consortium order computers directly from Apple. Every faculty member, student, or staff member who buys a Macintosh or other Apple product under the consortium program must sign an agreement averring that the computers are for their own personal use.

Administrative methods vary from school to school. For instance, Stanford requires all buyers who order a personal computer to pony up the entire amount to reserve their machine. At Rice University, however, a payment plan lets prospective purchasers put 20% down until the order is filled. Some schools will provide computers to their faculty, students, and staff for a flat rate; others will levy a small handling fee on top of the base price.

Participating universities welcomed Apple's proposal. This was their chance at up-to-date equipment

CARLOS AGUIRRE

At the 24 universities in the Apple University Consortium, students, faculty, and staff will be able to buy Macintoshes at a greatly reduced rate.

for use in all departments. "A lot of people initially said, 'Oh, this will be great for the humanities and social sciences,' but people realized that in all areas they could make use of it, reconceptualizing courses in the technical areas as well," says Priscilla Huston, director of Rice University's Institute for Computer Services and Applications.

Says Michael Carter, director of Academic Computing Information Systems/Instruction and Research Information Systems at Stanford University, "What we're hoping to see is several dozen faculty members become authors of instructional software, which will amount to homework assignments in their courses." Students could perhaps check out Macintosh disks at the reserve-book desk of the library, as they would a required book.

Some schools have used the consortium as a springboard to involve other vendors. The University of Michigan's brand-new Microcomputer Education Center will start out with Apples, but expects Zenith and IBM to join in. Stanford is currently negotiating with Hewlett-Packard, Digital Equipment Corporation, and IBM for its Micro-Disk Program.

Although everyone agrees that universities require state-of-the-art tools if computers are to have any real meaning on campus, the Apple Consortium's methods have aroused some controversy.

The resale question has yet to be fully answered. Lewin stressed that most of the universities in the consortium won't permit quick resale of the machines, typically requiring buyers to keep their purchase for at least 24 months. Often, says Lewin, if a buyer wants to resell before 24 months have passed, the university must have veto power. Under this type of contract, violation may result in dismissal or expulsion.

At least two universities *A+* contacted had no time limit for resale, however. Stanford hadn't completed its order form, but, said Carter, the current draft required only that buyers affirm that the purchase was for their personal use and not for resale. Additional clauses might be added, he said. At Rice University the contract also contains no clause restricting resale. The University of Michigan basically adheres to Apple's suggested agreement, even providing for possible lawsuits against those who resell too soon.

Most nervous are the Apple dealers located near consortium members. "The complaint by the retailers is, 'My tax dollar is supporting your institution, so why should I pay to have you undercut me?' " says Robert Fadden, store manager for Inacomp Computer Center in Ann Arbor, Michigan.

Apple is selling directly to the schools, and, as Lewin admits, it's "selling to the universities in such a way that the dealers couldn't compete."

Lewin emphasizes that universities are required to go to an authorized Apple dealer in their area if they can't service and support the machines students buy through the program themselves, so the dealers still have a chance at that business. Also, he said, the retailers will benefit hugely from the expected onslaught of software from the consortium schools.

"This is a long-term opportunity for the dealer to get involved with the community. If it wasn't Apple, who was it going to be? The other two primary vendors in the university marketplace are DEC and IBM," he pointed out. "Would they have cut the dealer in?"

Fadden has been cut in, thanks to a special program at the University of Michigan in which students can make consortium purchases through either the university or Inacomp. (Only the University of Notre Dame has a similar setup.) Although he won the bid, Fadden still doesn't like the situation: "I agree with the philosophy, but I don't think it should be done at someone else's expense. Some of the dealers are saying they're not going to be here that long."

Fadden cites a statewide buying plan in Michigan that allows schools to buy products through a dealer; the dealer gets a rebate for each purchase.

Lewin responds, "We understand their situation, but there are 3300 or so institutions—we went to 24. From a proprietary, small-business point of view, yes, if you're an independent businessman, your territory is the world. But if you're a company looking for feedback from universities about your technology, there's not much that the individual businessman can offer in the technology exchange. He can offer a lot in terms of support and service.

"Individual dealers will say, 'I'm losing all those potential sales.' Well, you can get a percentage of something, but you can't get a percentage of nothing. We want to be in business in a serious way, as a frontrunner, three years from now. We need to be thinking about the long-term." +

Applause at the Office Automation Conference, success at Softcon

Early Reports from the Field

Apple's Macintosh was a big hit with showgoers at February's Office Automation Conference (OAC) in Los Angeles, but many corporate buyers said they would wait to make significant purchases until they could connect Macintosh to their current machines. Attendees praised the Macintosh's ease of use and said the product's fancy formatting and printing capabilities would be attractive features for office use.

According to several corporate representatives, Macintosh-to-mainframe and Macintosh-to-IBM PC communications were the key pieces of additional software they would need to consider purchases. Apple was demonstrating only a preliminary version of the MacTerminal communications program, and several potential buyers said they wanted to see the finished product and a matching program for the IBM PC.

Apple showed the Macintosh and several finished and developmental software packages at the exhibition. Show attendees who requested a ticket also got a chance to test-drive the Macintosh themselves.

Participants saw a ten-minute demonstration, and then got a chance to work through the "Mousing Around" section of the "Guided Tour of Macintosh" diskette/cassette tutorial. Then, everyone had 15 minutes to try MacPaint and MacWrite.

I asked several groups of people what they thought of the Macintosh after the demonstration, and most were obviously already fond of the machine. Since they were business buyers, however, fondness was not sufficient justification for seeking authorization for company purchases.

"Our people already come in on their own time on weekends to use our Lisas," an insurance executive told me. "Mostly, they're using the Lisas to add fancier type to their memos and reports." When the Macintosh could communicate with his firm's existing PCs, he thought, he would probably recommend adding several Macintoshes.

A chemical-products data-processing manager told me he personally thought he'd buy a Macintosh—and maybe his firm would, if the Mac could communicate with its mainframe. "They want to network everything, and it'd have to fit right into the network like a PC," he told me.

The Star of Softcon

The Macintosh was the hottest product at Softcon in New Orleans in February, although in theory only the Macintosh software was on display. Large crowds thronged the Apple booth, and other firms showing Macintosh software also drew well.

MARY ROSS

At the Apple booth, the company displayed the Macintosh using MacPaint, MacWrite, a preliminary version of MacPlan, and Think Technologies' Pascal. Another Macintosh was acting as a terminal for a Lisa running UNIX.

Microsoft demonstrated some of its software for the Macintosh to sizable audiences. Microsoft BASIC and Chart should be in stores by the time this report is published, with Word and File arriving later this year.

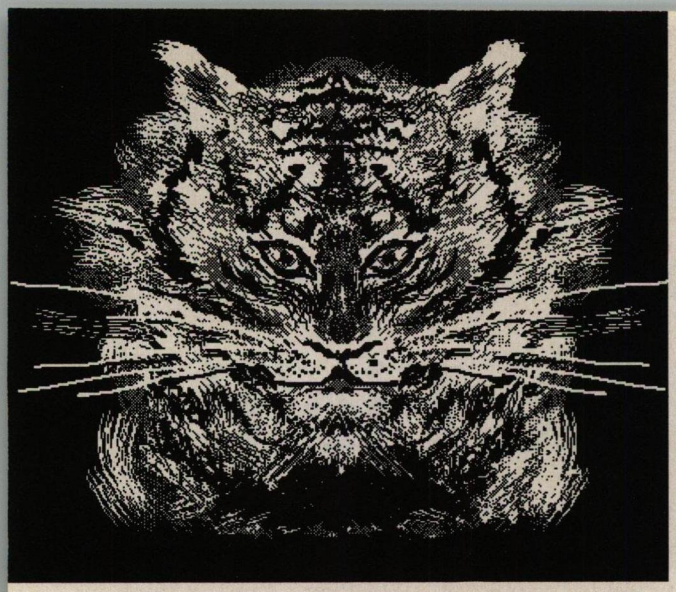
Lotus Development Corporation showed a preliminary version of a product similar to its 1-2-3 program that it is developing on the Mac. This package will have to wait for versions of the Macintosh with more memory than 128K, however.

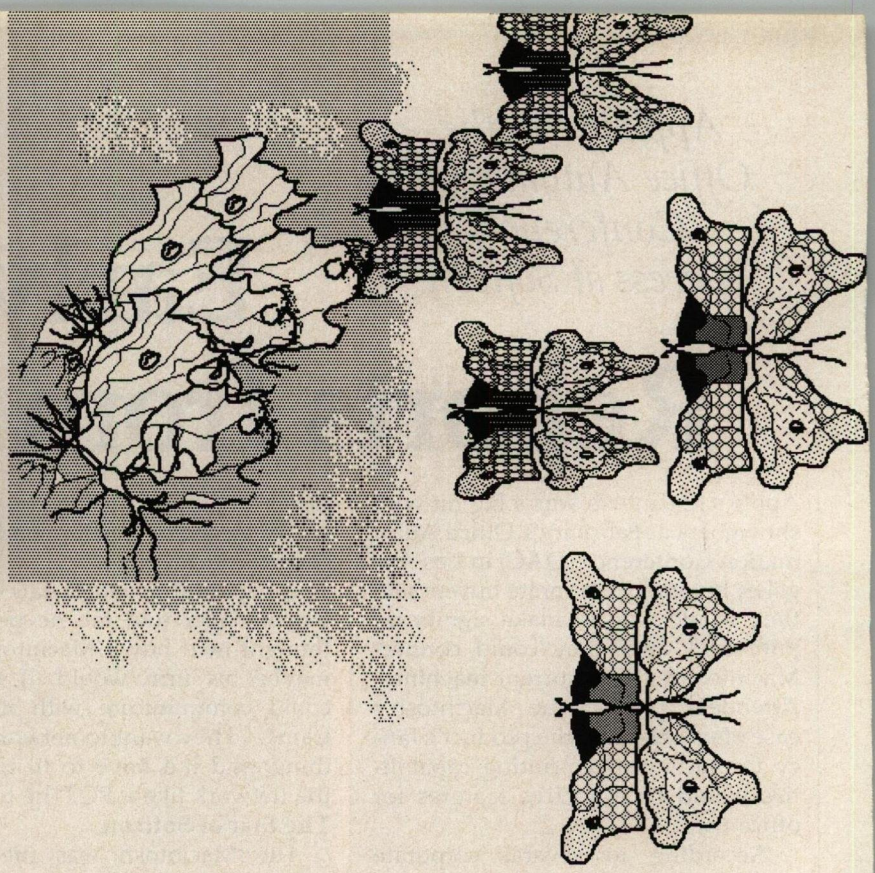
At least a dozen other firms were displaying Macintosh software in various degrees of completion. Living Videotext had its ThinkTank program running on half a dozen Macintoshes, while at Software Publishing Corporation's booth, a single Macintosh displayed a nearly complete version of PFS:File.

At the side of the arena, Odesta had its Helix database running on a Macintosh. Upstairs on the loge level, Artsci showed a system that mates a telephone with a Macintosh, including software that recalls phone numbers. The firm also had a Rolodex-like database that ran in any of five languages, complete with appropriate national icons.

Several dozen other firms were also displaying Macintosh Development Team posters or pins, and many more reported that they had Macintosh projects underway. The *A+* editors are assembling a preliminary list that shows numerous packages to be released by the end of the year.

Softcon, a new software-only show for large-volume buyers, brought more than 1000 software vendors to the New Orleans Superdome. +





MacPaint Magic

Conjuring up images with the Macintosh

Before I tell you about my experiences with and ideas about Macintosh's MacPaint program, I'll introduce myself. I'm an artist who has been addicted to many media beginning with whatever material was available to me in the crib. I have worked with oil, acrylic, watercolor, pastels, colored pencil, etching, woodcuts, silk screen, stained glass, fabric, needlework, typography, and now video and personal computers.

When I started experimenting with the MacPaint program on a Macintosh, I could not locate a manual. Even so, like magic, I was able to draw, paint, erase, flip, spray, move, copy, reverse, mirror, stretch, magnify, design patterns, fill, and mix in type with an array of font styles and sizes.

The MacPaint program is so fast and fluid that I quickly got results that would otherwise have taken piles of paper, pens, brushes, spilled messes, and days worth of work.

I know that MacPaint is only one of the Macintosh's programs, but if it were the only program for the machine, it alone would make having a Macintosh worthwhile. Every home should have such a tool. As personal computers become more widespread, they will influence our creativity. MacPaint on the Macintosh will affect the way we work because it allows our work to take on an element of play.

Before I launch into some ideas about how to use the MacPaint program for practical applications, here are a few criticisms of the product.

I wish color were available in MacPaint, although if it were, I might never tear myself away from the macine. I wonder why the program's name has the word *paint* in it. Paint can be black and white, but when we speak of painting, we always think of colors.

Another complaint I have is that you can see only one-third of a page on the screen at a time. I can accept the size limitations of the 8 × 10-inch screen. All means of expression have their own inherent limitations, and it is the artist's challenge to work within them and to use what is available to its maximum potential. The limitation of the screen size compared to the page size is a definite impediment, however. As I began to draw on the Mac, I tended to regard the image of the screen as the size of the entire page. Although the hand icon lets you move the page around, you can't see the entire image at once.

The program does have an option that allows you to see a reduced version of the entire page, but I found it unsatisfactory. What the View Page function actually does is show your drawing in such a reduced form that all the black dots are shrunk and it looks smudgy. It does not give you a true facsimile of what is later printed out. When you draw in black and white, you'll probably use shading, so detail is particularly crucial. The reduced, full-page view of your work does not provide this detail. You can see the image's location on the page, but you cannot tell what you need to correct. Perhaps a way to solve this problem partially would be to add an option that would let you view the page at various stages of reduction. The FatBits option gives you an image that is so large that you can't really see what it looks like, and the View Page option gives you too small a picture.

My third complaint about Macintosh/MacPaint is that I needed another disk drive.

Now that I have my complaints out of the way, I'll discuss some potential uses for it.

I can't imagine why anyone

"MacCat," "Butterflies," and "Portrait of Pierre Bonnard" by Adele Aldridge

wouldn't want a Macintosh with MacPaint. For artists and nonartists alike, it's like having a magic sketchbook. I feel sure the program is going to get even better in the future. I'm not suggesting that everyone should wait until it comes out with color. Not everyone likes color or needs it.

Graphic designers and artists can speed up the creation of anything that they would otherwise do freehand, because MacPaint lets them fine-tune their drawings instantly.

The program allows you to use type in a variety of styles and sizes, on the same page as your drawings, if you like. This ability is particularly useful for designing layouts, logos, newsletters, invitations, or stationery.

Any company that puts out a newsletter or any other printed material will find this program a wonderful, simple-to-use tool. I imagine small presses will love MacPaint, since they can use it with MacWrite to print pamphlets and books without using regular typesetting. The MacPaint manual itself was created on the Macintosh.

Here are some suggestions for general home use of MacPaint as well as for professional artists and writers:

- **Cartoon strips:** Use MacPaint to create cartoons, since it lets you combine drawings and text. The cartoon strip could be sent on-line to newspapers, magazines, or other Macintosh users.
- **Party invitations**
- **Concrete poetry:** Concrete poetry is visual language, and it warrants an article in itself.
- **Corporate brochures**
- **Storybooks:** MacPaint would be an excellent tool for creating illustrated stories or books. Children could write, illustrate, and print their own books and magazines.
- **Needlepoint designs:** By using the grid pattern, the mirror images, and a printer, you could create wonderful designs for quilts and all needlework.
- **Fabric design**
- **Dream journal:** This is a use that I'm going to take advantage of when I get my own Macintosh. I've kept a journal for years in which I log my dreams as an ongoing research project. Even though I'm an artist, I haven't illustrated my dreams because of the time it takes. Now I can easily integrate my writing, my concrete poetry, and my dream journal all in one. I can keep it on disk so no one can see it, or I can print it out.
- **Create more Macintosh software:** This is my next project.

This list of potential uses for this product could go on and on. Why not put your imagination to work? ✚

Macintosh and Lisa

Product News

Mac Disk
Davong System's Mac Disk, a series of hard-disk storage systems ranging from 5 to 40 megabytes, expands the new Apple Macintosh personal computer into a powerful and flexible business tool. Mac Disk's value in handling accounting, database management, and other big data applications, will be strengthened by Mac Tape, a 28-megabyte streaming-tape backup system for protecting data (scheduled for introduction in the third quarter of 1984).

Mac Link (also available in the third quarter of 1984) is a local-area networking system that will allow up to 255 Macintoshes in an organization to share hard-disk storage, communicate with each other, and share other resources, such as printers and plotters. (*List Price for Mac Disk: $1995, 5-MB; $2395, 10-MB; $2795, 15-MB; $3295, 21-MB; $3995, 32-MB; $4995, 40-MB*)
Davong Systems, Inc.
217 Humboldt Court
Sunnyvale, CA 94089
(408) 734-4900

CIRCLE 600 ON READER SERVICE CARD

NPL Information Management System
The NPL database system, released in April, is a nonprogrammer's language for developing complete data-management applications without conventional programming. It is modeled after other fourth-generation languages that have gained wide acceptance on mainframe computers. NPL programs look like English. Users say what they want—the computer figures out how to do it.

Because the sentences can include phrases for sorting, computation, totaling, and so on, the NPL System is suitable for a wide variety of file-management functions, such as personnel records, customer information, payroll, and inventory.

The Macintosh version of NPL is fully integrated into the Macintosh environment. Users can build NPL sentences by using the mouse to select keywords from dynamically adjusted pull-down menus. These programs can then be run immediately or stored in files.

Users can paint a form in a window for entering and editing the data. Automatic validation is also available for testing values, ranges, and data types.

All standard Macintosh editing capabilities (such as cutting and pasting) will be available for use in both forms and programs.

Apple/NPL is available for the Apple II and Apple III.
DeskTop Software Corporation
228 Alexander Street
Princeton, NJ 08540
(609) 924-7111

CIRCLE 601 ON READER SERVICE CARD

Art Department
Designed for use with LisaDraw, this graphics library, which comes on one 5¼- or 3½-inch diskette, contains more than 300 ready-to-use illustrations and figures. Art Department uses LisaDraw features such as sizing, on-line customizing of images with graphics or text, and the ability to change shading or select portions or groups of images for presentation.

Twelve general categories of illustrations are available: maps and flags, an extended alphabet, arrows and accent characters, the business environment (including symbols for various methods of communication, economic indicators, office equipment and furniture, modes of transportation, and so on), decorative elements, demographics, dotted lines and shapes, everyday life (including drawings of objects and concepts associated with the home and outdoors), people and other living things, standard graphs and axes, standard forms, and symbolic images (including images of idioms and abstractions, such as time and thinking). (*List Price: $195*)
Requires: Lisa 2 Series; LisaDraw
Business & Professional Software
143 Binney Street
Cambridge, MA 02142
(617) 491-3377

CIRCLE 602 ON READER SERVICE CARD

Wizardry for the Macintosh
Wizardry for the Macintosh is a brand-new game. Reprogrammed for the new computer, this fantasy game from Sir-Tech Software allows one or more players to adventure in a dark and mysterious maze, traveling from dungeon to dungeon, fighting monsters, and winning a variety of arcane items. Wizardry's designers expect to release the Macintosh version this spring.
Sir-Tech Software, Inc.
6 Main Street
Ogdensburg, NY 13669
(315) 393-6633

CIRCLE 603 ON READER SERVICE CARD

Mac-Forth
Mac-Forth, an interactive, multitasking programming environment for the Macintosh, provides system developers and users with the ability to develop their own applications.

Mac-Forth integrates interactivity, speed, and flexibility with the graphics windows, menus, mouse selection, and file structure of the Macintosh user interface. *(List Price: $24.95, Single Systems License)*
Creative Solutions, Inc.
4801 Randolph Road
Rockville, MD 20852
(301) 984-0262

CIRCLE 604 ON READER SERVICE CARD

Fast Track
Fast Track is a software system for a series of application packages that require interactive tracking of dollars, units, hours, or materials. Fast Track makes extensive use of the Macintosh user interface, incorporating graphics and editing features, in the following packages:

The Time Manager is a professional time-and-billing system with multiple sorting levels and categories (by client, job, date, and work order for expenses/hours).

The Office Planner uses Macintosh quick-draw features to depict furniture size, shape, and arrangement, and includes scaling and rotation of objects.

A look at new products to complement your Macintosh or Lisa.

Material Manager is a material-inventory system that maintains units and dollars by categories and other user-specified sorting parameters. This system can track and report fixed assets as well as nondurable goods. A remote MSI 88 terminal permits the use of bar codes. *(List Price: $99.95 per application, Single System License)*
Creative Solutions, Inc.
4801 Randolph Road
Rockville, MD 20852
(301) 984-0262

CIRCLE 605 ON READER SERVICE CARD

DS220 Multimode Matrix Printer
Designed to operate with high-performance micro- and mini-based business systems, the DS220 Multimode Matrix Printer combines three different printing capabilities: correspondence printing for word processing, draft-quality printing for high-speed data processing, and dot-addressable graphics.

In Correspondence mode, the DS220 generates an 18 × 48 dot matrix for near-letter-quality appearance. Using a high-resolution two-pass-mode technique, the DS220 prints at 40 characters per second. Included as standard features are two correspondence-quality fonts, two memo fonts, variable-pitch draft fonts, and a special micro-character set. Also resident are seven international character sets. For print-intensive applications, the DS220 operates at 220 cps utilizing bi-directional logic-seeking printing. The high-resolution dot-addressable graphics feature of the DS220 has the ability to print up to 217 columns for spreadsheets and then graphically output the results.

Compatible with virtually all microcomputers, the DS220 includes both serial and parallel interfaces as standard features along with a 2000-character buffer. (*List Price: $1995*)
Requires: Apple II, II Plus, IIe, or Lisa
Datasouth Computer Corporation
4216 Stuart Andrew Blvd.
Charlotte, NC 28210
(704) 523-8500

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Coming Up in Product News

Lotus 1-2-3, from Lotus Development Corp.
Participatory Novels, from Infocom
Run for the Money, from Scarborough Systems, Inc.
Macintosh 5-Megabyte Cartridge Winchester, from Tecmar, Inc.
The Candy Apple IEEE488 Interface for Macintosh and Applebus Peripherals, from Tecmar, Inc.
Telephone/Modem Interface for the Macintosh, from Tecmar, Inc.
PFS:File and **PFS:Report**, from Software Publishing Corp.
Professional Tax Planner, **Estate Tax Planner**, and **Personal Tax Planner**, from Aardvark/McGraw-Hill
Home Accounting, from Ask Micro, Inc.
Millionaire Tycoon, **Squire**, and **Baron**, from Blue Chip Software
Training Programs, from ATI
The Client Management System, from Compu-Law, Inc.
The Home Accountant, from Continental Software
Dr. Logo, from Digital Research, Inc.
Habadex (telephone management), from Haba Systems, Inc.
Sargon III, **The Calendar**, **The List Manager**, **The Planner**, **Butter** (spreadsheet), and **Go**, from Hayden Software Company
Telofacts I, **Telofacts II**, **Mac Tutor**, **Brain Games**, **Mac Communications Package**, from Dilithium Software
Communications System, from Hayes Microcomputer Products, Inc.
The Sales Edge, **The Management Edge**, **The Negotiation Edge**, from Human Edge Software Corp.
Megawriter, **Megaspeller**, **Megafinder**, from Megahaus Corp.
ThinkTank, from Living Videotext, Inc.
Microsoft Chart, **Microsoft Word**, **Microsoft File**, from Microsoft Corp.
The Graphic Magician, **Transylvania**, **The Quest**, and **The Coveted Mirror**, from Penguin Software, Inc.
Datatalker, **3780/3270 bisync. emulation**, from Winterhalter, Inc.
MasterType, **Songwriter**, **PictureWriter**, **Phi Beta Filer**, and **PatternMaker**, from Scarborough Systems, Inc.
IFPS/Personal, from Execucom
CRTplus, from Aurora Systems, Inc.
From AgDisk/Harris Technical Systems:
Financial Mangement, **Series One**
Machinery Management
Corn/Soy Bean Management
Crop/Livestock Profit Projector
Seven Multiplan Templates, including **Business Management**, **Machine Management**, **Swine Farrowing**, **Swine Finishing**, **Crop Management**, **Cow/Calf Management**, **Feedlot Cattle Management**

ELECTRONIC ORACLE

THE DELPHI TELECOMMUNICATIONS SERVICE PROVIDES A WIDE RANGE OF INFORMATION, COMMUNICATIONS, AND ENTERTAINMENT.

When the ancient Greeks sought the wisdom of the gods, they made a pilgrimage to the Temple of Apollo at Delphi. There the God Of Truth, through the prophecies of a priestess, enlightened the pilgrims who had made the journey along the Sacred Way and who had purified themselves in the sacred Castalian Spring.

Now, 2500 years later, a new, electronic oracle—Delphi, from General Videotex Corporation—informs modern Americans by offering them a variety of information, communication, and entertainment services through their personal computers. Telephone lines replace the Sacred Way, the ritual of entering passwords supplants the purification rites, and mainframe computers take the place of the priestess.

Since it began operating in February 1983, Delphi has attracted about 1000 subscribers. The system uses a menu-driven approach to let subscribers navigate around the system. The main menu lists general sections, and submenus list individual services.

Delphi's information services reside in News, Library, Financial Services, On-line Market, Travel, Appointment Calendar, and Profile sections.

The News section, provided by ITT/Dialcom, Inc., contains stories from the day's UPI newswire and is divided into 17 options for easy and selective searching. Six options provide business, sports, broadcast, state, regional, and national and international news. Five options hold the schedules for the Senate, House, president, White House, and Capitol Hill. Other options contain miscellaneous stories.

One option, Profiled Stories, lets you search the entire News section using specific keywords. This type of searching, called free-text, retrieves all stories containing the keywords. For instance, typing APPLE and COMPUTER will net all stories about Apple computers and Apple Computer, Inc. Those keywords could also pull out a story about an orchard whose owner uses a computer to keep track of his apple inventory. The more specific the keywords, the greater your chance of retrieving stories pertaining to your particular interest.

The Library section contains services that provide reference information. It consists of the Kussmaul Encyclopedia, the Research Library, the Librarian, Delphi Info, and the Dialcom Library.

The Kussmaul Encyclopedia contains more than 20,000 entries, with about half of them cross-referenced to other entries. To use this service, simply type in a word, such as *Delphi*, and the computer displays the entry and a list of cross-references. If the word does not match an entry, the computer deletes letters one by one from the end of the word until an entry matches the beginning letters.

The Research Library, produced by Dialog Information Service, Inc., provides about 200 specialized databases on every topic from agriculture to world textiles. This service uses a more complicated free-text searching procedure than that of the Kussmaul Encyclopedia. A separate manual is sent to subscribers who sign up for the Research Library.

The Librarian, operated by COIN, Inc., is an off-line research service. A staff of trained researchers scours various databases for information about your particular subject and then sends the results to you via Delphi. COIN also offers optional hard-copy delivery.

Delphi Info provides various information about the Delphi system, such as Telenet and Datapak/Telenet telephone numbers and rates.

The Dialcom Library, from Dialcom, Inc., contains more than 100 programs that can perform a variety of tasks, from balancing your checkbook to performing statistical analyses. All documentation for these programs is available on-line.

Turning to the Financial section, Delphi offers investment advice and a brokerage service. Investment advice comes from Security Objective Services, which

RONIC CLE

offers an extensive electronic-investment newsletter. This firm reviews stocks and bonds by the week and year, evaluates particular securities, and makes recommendations. Another firm, Initial Public Offerings, Inc., gives advice about new stocks and funds through its on-line newsletter.

Once you've figured out what stock to buy or which fund to invest in, you can open an account with North American Investment Corporation. You receive a 10% discount on commissions, and you can make transactions through Delphi 24 hours a day, seven days a week. North American Investment also offers an investment research and recommendation service.

Now that you've made a fortune, one way to spend it is through the On-line Market, an electronic shopping service that consists of a Catalog and a Bazaar. The Catalog lets you order items from various merchants, and the Bazaar functions as a large marketplace where subscribers meet to buy and sell goods.

The Travel service posts airline schedules and allows you to make airplane, hotel, and automobile reservations, and the Appointment Calendar service keeps track of appointments for up to one month in advance.

One of the most interesting places in Delphi is the Iamwhois service in the Profile section. Iamwhois lists all subscribers in alphabetical order according to their member name, which can be a real name, nickname, or pseudonym. Iamwhois lets you post general information about yourself, such as what type of computer you own, location, and hobbies, for other subscribers to read. Subscribers can contact others with similar interests, using one of Delphi's four communications services.

The Bulletin-Board section is a place to post public messages. It is divided into five categories: Computers, Delphi, General, Interest Groups, and Reviews—with each category listing specific boards. For example, the Computers category contains boards dealing with all major computer types, as well as CP/M systems and modems.

The boards seemed scarcely used when I reviewed this system, most likely a result of Delphi's recent start-up in February 1983. The Software Review board held a couple of half-hearted reviews, while the Gossip board contained not a single juicy tidbit. The messages are not numbered, so you don't know how many messages are on a board. You can avoid reading old messages by requesting messages after a certain date. Two nice features about the bulletin boards are the ability to save a message in your electronic mailbox and to reply directly to a message's author while you're in the Bulletin-Board section.

Electronic mail allows you to send letters to any subscriber's electronic mailbox. You can even send mail to Oracle. Fast and easy to use, the mail service lets you forward one letter to multiple mailboxes, file letters for future use, and even send letters to subscribers of CompuServe and The Source.

Conference allows you to hold "live" conversations with one or more other subscribers. Whatever you type in is sent to the other subscribers' terminals. Like a large party line, conversations can get confusing when more than a half-dozen subscribers "talk" at the same time. You can always get a word in edgewise by typing in text, however. Most subscribers converse using their member names, the name listed in Iamwhois, but for those who desire anonymity, pseudonyms are acceptable.

Delphi Oracle is a feedback service rather than a true communications service. The Oracle consists of a team of experts who answer questions about the system, service, telecommunications, and just about anything else relating to computers. Answers, prophecies, and other items of arcane wisdom are sent within a few days after requests are made via electronic mail.

Delphi offers a variety of interesting and innovative entertainment services in the Games, Writer's Corner, and Infomania sections. Delphi would boast an even more impressive array of games if all those listed in the manual were actually running. General Videotex's customer service reports, however, that many are still under development. Still, you have quite a selection. The Games section breaks down into Adventures, Board Games, Delphi Casino, Kiddie Korner, Logic Games, and Sports

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Available at your local computer dealer or direct from ALF. Includes both DOS 3.3 and ProDOS versions. Apple is a trademark of Apple Computer Inc.

ALF ALF Products Inc. 1315F Nelson St. Denver, CO 80215 (303) 234-0871 Telex: 4991824

Games. Adventures features two games, Zork and the original Adventure, perhaps the best-known of all adventure games. This section also includes Star Trek, the classic game of interstellar Klingon hunting.

Board Games contains backgammon and Othello, as well as Qubic, a three-dimensional tic-tac-toe game, and Hexapawn, a pawns-only game of chess played on a 3 × 3-square board. Regular chess and checkers are not available.

Delphi Casino brings a touch of Monte Carlo by offering craps, darts, roulette (even the Russian variety), and poker.

Kiddie Korner, a relatively new service, holds a game called Bug, which improves eye/hand coordination under time pressure. The game has enough creativity to capture a child's attention, although the graphics could be more imaginative.

The five logic games stress mathematical skill, logic, and analytical ability. Mostly, they require you to juggle numbers to fulfill an objective. Of the lot, an old favorite called Wumpus and an updated version called Super Wumpus hold the most interest. Both require that you explore a dungeon setting as in an adventure game, but, like the reader of mystery novels, you must analyze clues to find the hideous Wumpus before shooting it full of arrows.

Like the reader of mystery novels, you must analyze clues to find the hideous Wumpus before shooting it full of arrows.

The sports games, football and boxing, are single-player games.

Writer's Corner offers aspiring writers and programmers the opportunity to be published. Writers can create a short story or poem and submit it to Delphi's editors. Programmers can write a program in BASIC, Pascal, COBOL, or FORTRAN and then compile it. If the Muses inspire your prose or programming, Infomania will publish it. If "best-sellers" find their way into other parts of Delphi, their authors could receive royalties.

Infomania contains creations from Writer's Corner as well as other subscriber-contributed material. Short stories and poems are found under Author. The Newsletter service holds numerous subscriber-written newsletters covering many topics. Member's Choice carries programs that may or may not be useful. For example, PAMS lists bulletin boards outside of Delphi. Reporter churns out lengthy, turgid sentences written in bureaucratic jargon.

Infomania also contains an interesting service called Collaborative Novel. You read what someone has already written and then continue the story. Because the Muses cannot visit everyone, ideas and style are often uneven; but that's part of the charm. Occasionally, someone becomes malicious. In Star Tracks, a Star Trek spoof, Captain Quirk and the Enterprise participated in all sorts of interesting interstellar incidents until a user with questionable motives wrote a paragraph that blew up the Enterprise. Fortunately, the next writer noted that the Enterprise had carried the Genesis machine and the star-hopping story line continued.

The manual states accurately that "Delphi was designed for humans." The system is easy to use and features

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DISTAR Apple drive is not an adaptation of other mechanisms. DISTAR is a wholly engineered unit for the Apple II, IIe and Franklin. DISTAR's direct drive system allows for quieter operation, more accurate tracking and longer life than conventional belt driven units.

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CIRCLE 450 ON READER SERVICE CARD

three prompts for different levels of expertise. The menu-driven approach helps the beginner navigate through the system. An experienced subscriber may eliminate the menus and receive an explanatory prompt. An expert can choose to receive only a one-word prompt.

All services contain a Help option, which describes and discusses how to use all the commands. The Help command is so thorough that it even explains the command Help.

For new subscribers, the main menu offers a Guided Tour, which is a cross between a free-running demonstration and a programmed-instruction tutorial. It describes the services and features of Delphi, discusses how to access them, and lets you set various technical parameters such as passwords, prompts, and screen dimensions. You may leave the tour after any screen.

The 162-page manual contains clear and thorough instructions for using Delphi. Each section of the manual corresponds to one of the general sections on the system. The manual also lists the programs in the Dialcom Library, the databases in the Research Library, and Tymnet telephone numbers.

The manual, which was printed before Delphi was on-line in its current form, possesses a few errors that present minor inconveniences. Delphi is only available through Telenet, so the Tymnet numbers are useless. Some of the on-line sections have been changed or merged with other sections, so the manual may not exactly describe a particular section. Finally, the manual does not contain an index. Until you become familiar with each section, finding a particular service requires a bit of hunting.

Subscribing to Delphi is a lot like buying a car. The base price provides a standard model, but options can boost the price.

So how much does the wisdom of the gods cost? Well, subscribing to Delphi is a lot like buying a car. The base price provides a standard model, but options can boost the price significantly. You can pay with MasterCard, Visa, or American Express, or you can set up a $25 noninterest-bearing account and be billed directly.

Delphi charges a one-time $49.95 registration fee and $20 per hour during prime office time, from 8:00 A.M. to 6:00 P.M. local time Monday through Friday, and a reasonable $5 per hour during home time, which is any other time. Using Telenet, however—the only way to reach Delphi—will cost an additional $1 per hour during home time and $4.50 per hour during office time.

Some services are optional and cost extra. News, Dialcom Library, and Travel are $11 per hour during home time and $15 per hour during office time. The Research Library from Dialog costs a whopping $25 to $300 per hour extra. Librarian, from COIN, costs $25 per hour, with a $25 minimum fee.

Delphi provides 25,000 characters or 24K of storage free and charges $0.05 for each additional 1000 characters. Thus, 128K of storage space will cost about $6 per month.

General Videotex plans to add many services to Delphi in the near future, some carrying additional premiums. The firm is seeking regulatory approval to offer electronic banking, which would cost $1.75 per month extra. Plans exist to add Comp*u*store, a shop-at-home service that could add a $25 annual fee

Now you can monitor and control the world (or at least your part of it) with a little help from

APPLIED ENGINEERING

12 BIT, 16 CHANNEL, PROGRAMMABLE GAIN A/D

- All new 1984 design incorporates the latest in state-of-art I.C. technologies.
- Complete 12 bit A/D converter, with an accuracy of 0.02%!
- 16 single ended channels (single ended means that your signals are measured against the Apple's GND.) or 8 differential channels. Most all the signals you will measure are single ended.
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- Very fast conversion (25 micro seconds).
- Analog input resistance greater than 1,000,000 ohms.
- Laser-trimmed scaling resistors.
- Low power consumption through the use of CMOS devices.
- The user connector has +12 and -12 volts on it so you can power your sensors.
- Only elementary programming is required to use the A/D.
- The entire system is on one standard size plug in card that fits neatly inside the Apple.
- System includes sample programs on disk.

PRICE $319

8 BIT, 8 CHANNEL A/D

- 8 Channels
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- On Board Memory
- Fast Conversion (.078 ms per channel)
- A/D Process Totally Transparent to Apple (looks like memory)

The APPLIED ENGINEERING A/D BOARD is an 8 bit, 8 channel, memory buffered, data acquisition system. It consists of an 8 bit A/D converter, an 8 channel multiplexer and 8 x 8 random access memory.

The analog to digital conversion takes place on a continuous, channel sequencing basis. Data is automatically transferred to on board memory at the end of each conversion. No A/D converter could be easier to use.

Our A/D board comes standard with 0, 10V full scale inputs. These inputs can be changed by the user to 0, -10V, or -5V, +5V or other ranges as needed.

The user connector has +12 and -12 volts on it so you can power your sensors.

- Accuracy: 0.3%
- Input Resistance: 20K Ohms Typ

PRICE $129.00

SIGNAL CONDITIONER

Our 8 channel signal conditioner is designed for use with both our A/D converters. This board incorporates 8 F.E.T. op-amps, which allow almost any gain or offset. For example: an input signal that varies from 2.00 to 2.15 volts or a signal that varies from 0 to 50 mV can easily be converted to 0-10V output for the A/D.

The signal conditioner's outputs are a high quality 16 pin gold I.C. socket that matches the one on the A/D's so a simple ribbon cable connects the two. The signal conditioner can be powered by your Apple or from an external supply.

FEATURES

- 4.5" square for standard card cage and 4 mounting holes for standard mounting. The signal conditioner does not plug into the Apple, it can be located up to ½ mile away from the A/D.
- 22 pin .156 spacing edge card input connector (extra connectors are easily available i.e. Radio Shack).
- Large bread board area.
- Full detailed schematic included.

PRICE $79.00

DIGITAL INPUT/OUTPUT BOARD

- Provides 8 buffered outputs to a standard 16 pin socket for standard dip ribbon cable connection.
- Power-up reset assures that all outputs are off when your Apple is turned on.
- Features 8 inputs that can be driven from TTL logic or any 5 volt source.
- Your inputs can be anything from high speed logic to simple switches.
- Very simple to program, just PEEK at the data.
- Now, on one card, you can have 8 digital outputs and 8 digital inputs each with its own connector. The super input/output board is your best choice for any control application.

The SUPER INPUT/OUTPUT board manual includes many programs for inputs and outputs. A detailed schematic is included.

Some applications include:
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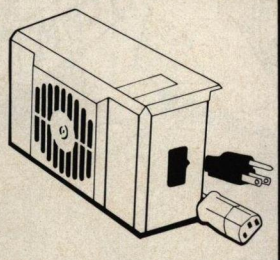
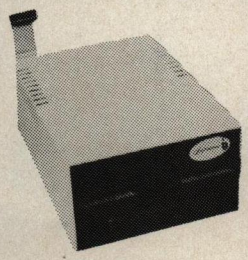


• Snaps on the side of APPLE II, II+ and *IIe** enclosures • Eliminates overheating problems, thereby boosting reliability and operation life of computer • Switch on front serves as power switch for fan, computer, and extra outlet • Line surge protection • Size: 7"L x 2⅜"W x 4¼"H • Wt.: 2 lbs.

APF-1 . . . . . $49.95

APPLE™ Compatible 5¼" Disk Drive



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JE520AP

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CEN36M-15-F	L	15'	28.95

IBM PC Parallel Printer Adapter Type
(CDB25 Male to Centronics Male)

Part No.	Length	Price
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CDB25P-15-CEN36M	15'	22.95

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Style L Male to Female

We stock over 200 different cables. If you don't see what you need, please call.

5¼" Diskettes

SSDD = Single Sided Double Density
DSDD = Double Sided Double Density

ULTRA MAGNETICS

Part No.	Description	Boxed	Price
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UM52401	DSDD with Hub Ring	10	32.95

SK (ESKEI)

SK1D	SSDD with Hub Ring	10	$20.95
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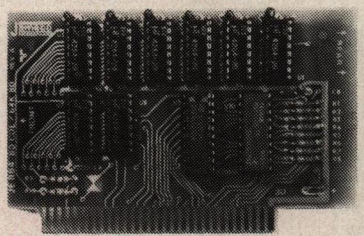

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Board: High density board design squeezes 64K bytes of RAM onto a 2½" x 4½" board • Fully tested to assure proper operation.

Uses: Word processing – displays 1000 more characters per screen • Extra memory allows running of extremely large programs • Ultra High Resolution Graphics capability.

JE864 . . . . . $149.95

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The JE614 is a newly introduced numeric/auxiliary keypad for the APPLE *IIe.** It offers the flexibility of a 10-key pad and the convenience of 23 directly accessible functions. Screen manipulating functions make word processing a snap and cursor controls make the keypad ideal for VisiCalc** users. The JE614 Keypad is housed in a durable metal enclosure and is color-coordinated with your APPLE *IIe* computer. Operation of the keypad can begin within minutes from unpacking. Special functions include: Home, Clear, Clear to End of Screen, Scroll-Up, Scroll-Down, Tab, Delete, Left, Right, Up and Down. Each key has auto-repeat. Size: 5⅞" L x 4-3/16" W x 1¼" to 2½" Slope.

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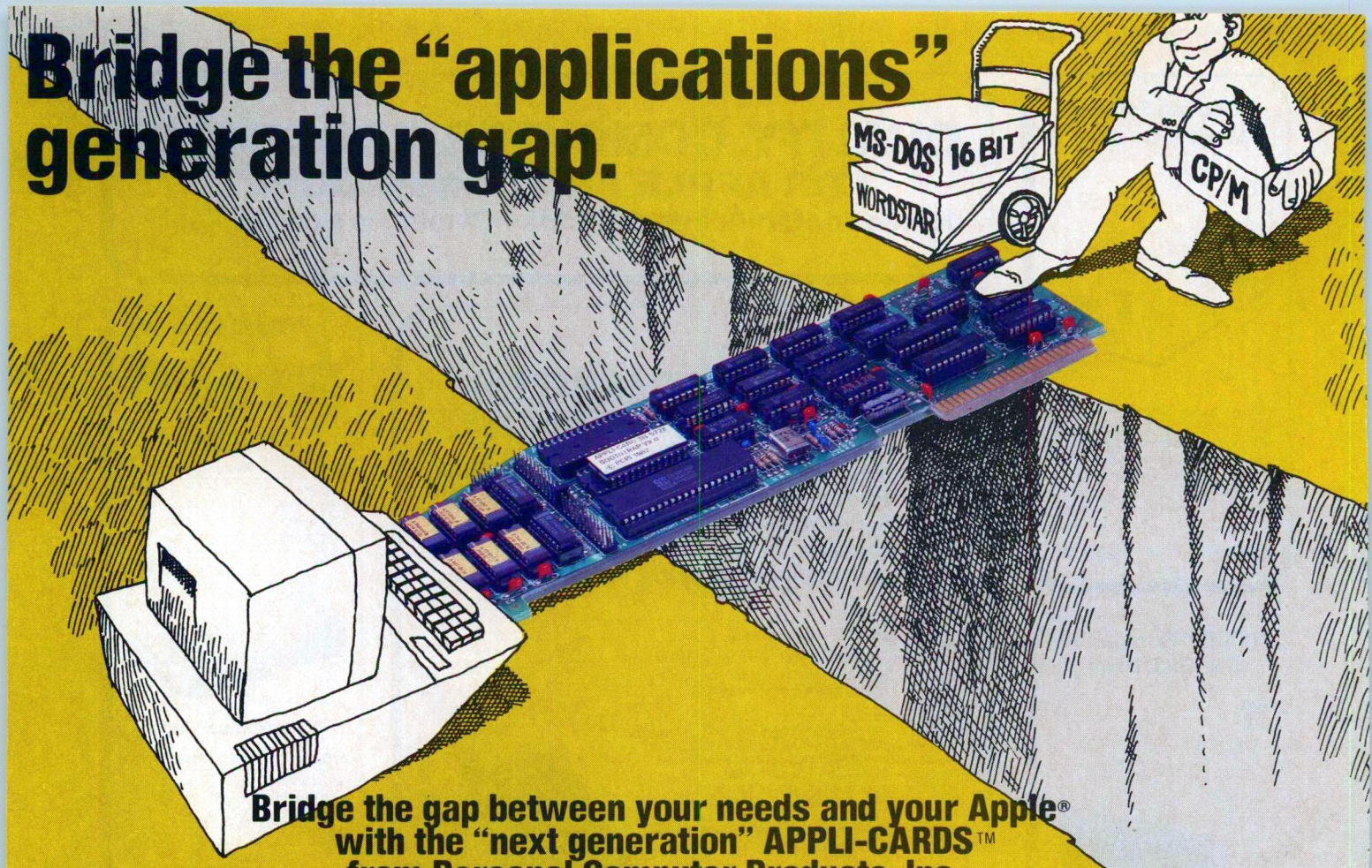

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The "new generation" Z-80 card that not only opens the door to the thousands of CP/M application programs available, but turns your Apple /// into an industry standard word processor. Make your Apple /// a powerful CP/M computer!

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and $5 per hour, and a typesetting service charging $2 per 1000 characters.

On the no-fee side, General Videotex plans to start a Business Program Library within Delphi that will contain spreadsheet, inventory, and accounting programs, and plans to offer educational tutorials covering a wide range of subjects. Several multiplayer games are under development, including Parsec, adventuring through the galaxy; Timelords, exploring the fourth dimension; and Scales of the Gods, battling monsters in a medieval fantasy world.

Safecracker, another game under development, promises to be particularly interesting to hackers. Delphi sets up an elaborate security system surrounding an electronic safe. The safe contains an amount of play money. The first subscriber to crack the security system, open the safe, and report the correct amount of play money to Delphi will receive public recognition and $100 in system time. Safecracker might even keep the hackers out of Department of Defense computers.

With the passage of time, Delphi of modern America may become as popular and preeminent as the Delphi of ancient Greece.

An agreeable system with innovative features makes Delphi an appealing telecommunications service. Although it has been in operation for a little over a year and does not contain as many offerings as the more established telecommunication services, Delphi's future looks promising. The system is fun to use. It encourages interaction between subscribers through the Iamwhois service. It treats you like a person, giving you an ID name instead of an ID number. The addition of more services can only increase its allure and usefulness.

Delphi has started out well for a telecommunications newcomer. It offers a good selection of information, communication, and entertainment services. With the passage of time, Delphi of modern America may become as popular and preeminent as the Delphi of ancient Greece. ✚

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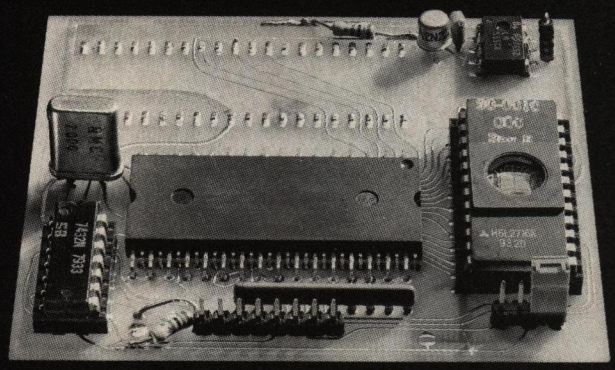

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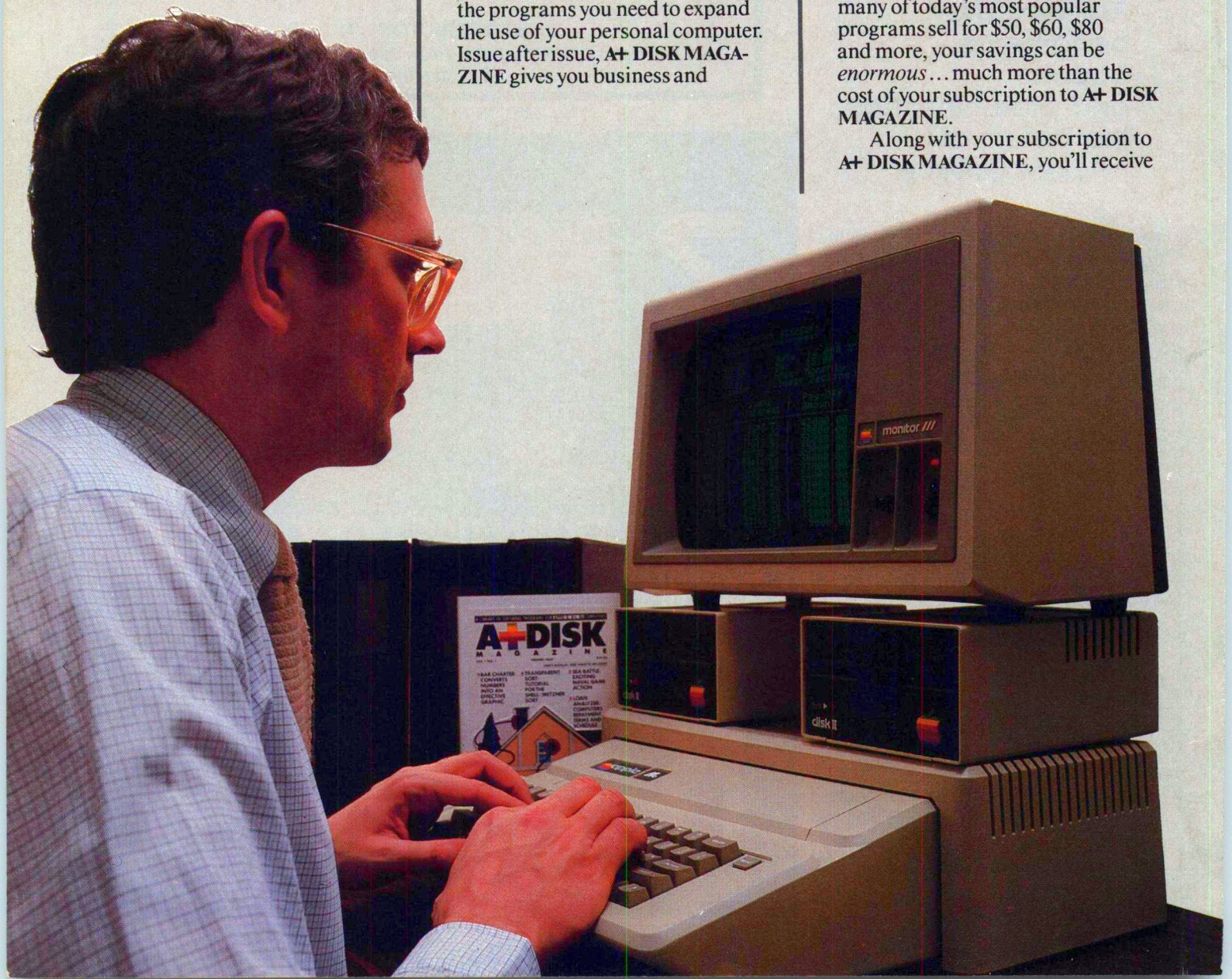

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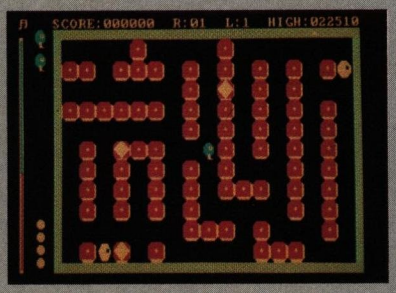

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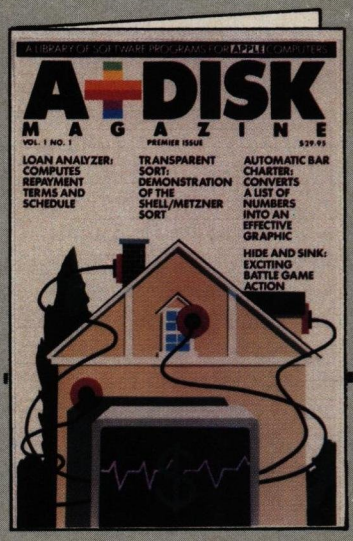

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GOLDEN'S APPLES ARE BECOMING DELICIOUS

Morley Golden has a firm grip on his construction company because he has learned to use micros to his advantage.

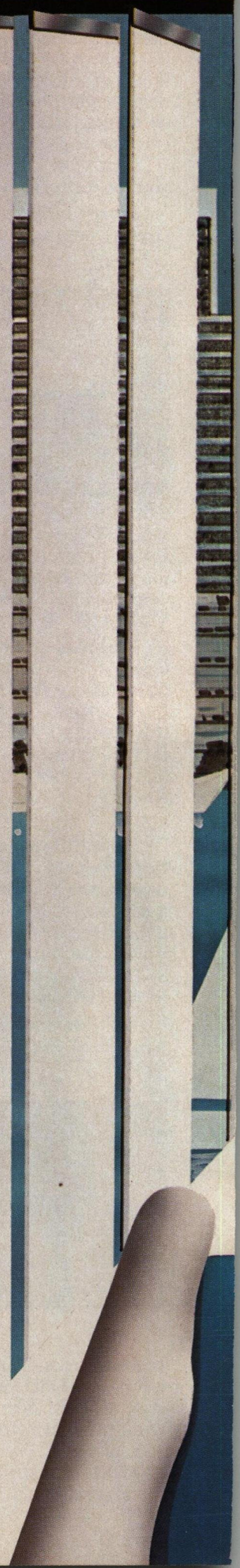
For six years, Morley Golden, 41, has been running one of San Diego's largest construction companies—not bad for a guy who started as a part-time laborer and has held, as he says, "every job there is to be held" on the operating side of the business. It's not surprising because his firm, M.H. Golden Construction Co., was started by his grandfather in 1927; Morley became chief executive officer when his father retired in 1977.

Morley Golden isn't just another boss's son. To stay at the top of the heap in the rough-and-tumble general contracting business, a company needs something to give it an edge over the competition. For Golden that something is computers. While his company has been changing San Diego's skyline, Golden has been putting together what he and others believe to be one of the best computer "back rooms" in the business.

"We think we've got the most comprehensive system in the industry," Golden says. "As far as our internal management goes, we use it for everything, literally: estimating, bidding, scheduling, job costing—a total integrated system. A lot of people have components, but very few people have *all* the pieces; we think we've got all the pieces and are continually refining the system." Over the years the company has gone through four generations of mainframe computers, beginning with a batch-processing IBM mainframe that has evolved into an interactive, 16-terminal Hewlett-Packard 3000 minicomputer system that Golden installed six years ago. The latest refinement in that evolution is a handful of Apple II personal computers.

Despite Golden's mainframe muscle, it's the Apples, which started out as a novelty for the boss four years ago, that are becoming the workhorses for his $90-million-a-year general construction concern. With the aid of such off-the-shelf software as VisiCalc (a spreadsheet), DBMaster (a database-management program), Desktop Plan (a financial-planning aid), and similar applications programs, Golden's Apples have mushroomed from Morley's single unit that he used at home occasionally to nearly a dozen machines receiving intensive attention throughout the company's offices and in the homes of its top executives.

For example, M.H. Golden now uses the Apples for budgeting, business projections, mailing lists, and company expense analyses. Combining Apple graphics with numerical tables, Morley developed a unique income-analysis package that has replaced the quarterly job-progress reports called "guesstimates." It shows him at a glance when one of the company's three dozen projects is out of line. By hooking a modem to the telephone line and using the micro as a terminal, his accountants can now get investment information



A DANIELS

from several public database services such as Dow Jones. They're able to call the company's commercial bank to get daily readouts of the firm's bank accounts and the latest money-market conditions. This has improved the company's cash and investment management. Even secretaries, usually not amenable to the idea of using micros for word processing, are creating memos, letters, and internal reports on these little machines.

Different Jobs for the Apple

The mainframe is still the backbone of the firm's important bidding analysis and the huge database that goes with it, but the Apples are continuing to grab important jobs from the larger machines. Recently the Operations Department developed a VisiCalc-based Billing Schedule to track projects on an actual cash-flow basis. Rather than estimate cash outlays in quarterly chunks and then divide each quarterly total during the four months as most construction firms do, Golden's Billing Schedule permits project managers to identify the points where major cash disbursements are made. This improves cash-flow management by showing project managers how much money is needed and when. As with several other projects, this schedule used to be handled on the HP, but it took longer to get less detail—and it required a programmer.

"All of our receivables are monitored on the Apple—not on the 3000," Golden says, as are all of the firm's budget and monthly cash projections.

Why Apples for all of this and not the mainframe? One reason is security. "Somebody has to get his hands on the right 5¼-inch disk to know what I'm thinking," Golden explains. But the real reason, he says, is that the Apple is "convenient and it's friendly."

It's also quick. In one case, Golden recalls, a problem occurred requiring an unusual change in the billing format for one of the company's projects. It was a one-time peculiarity, but to change the format on the mainframe computer would take three weeks and would require a programmer. "We came in on the weekend, and by noon on Saturday had it solved on the Apple."

Golden's Start with Apples

Golden's introduction to personal computing was unusual in several respects. His initial contact with micros was so casual as to be almost frivolous. "About four years ago when personal computers started coming out, I said, more as a lark than anything else, 'Why not?' and bought an Apple." A self-confessed "gadget freak," Golden looked at the competition but chose Apple on the basis of its versatility, its expandability, and the availability of good software.

He took his new toy home and put it through its paces with various programs such as VisiCalc and Apple Writer and some traditional games. The idea was to see what he could do with the machine; the *last* thing on his mind was business. "I had no intention whatsoever of ever getting it involved in a business application," he says. "That just evolved." Indeed, with a $500,000 Hewlett-Packard 3000 churning away in the back room and terminals scattered throughout the premises, Golden's little 11-pound, $2500 Apple II would appear superfluous.

It wasn't long, however, before VisiCalc and Desktop Plan started crowding out Snoggle and Space Warriors; a few months later, Golden put the company's planning budget on the Apple. "I used Desktop Plan to go back and develop a history and do the departmental budgeting for year-end planning," he says. One thing led to another: "I got into bonus distributions and salary analyses and things like that."

The Apples are continuing to grab important jobs from the larger machines.

His first ambitious project is the cash-flow-analysis package—using Desktop Plan and VisiCalc—that tracks receivables and allows him to spot abnormal income flows for any of the company's three dozen ongoing construction projects. By graphing historical income data with past jobs, he constructs high and low limits in a pair of "banana curves" representing the range of monthly income flowing from any given construction project. If the income of any month falls outside that range, it's a red flag—something is probably wrong. "Either somebody's billing too fast or too slowly, or the job is falling behind schedule or something isn't right," he explains.

Golden feels it's typical of the construction industry to monitor jobs in progress by checking expenses because it's easier to do this by keeping track of subcontractor costs. He believes "the income side is more indicative of the progress of the job and the overall big picture."

Although he was curious to learn BASIC seven years ago (he and his senior vice-president learned it from the HP-3000 manual and wrote some applications programs for that system), Golden says he has no inclination to delve into the mysteries of computer languages. "I have not wandered off into FORTRAN or COBOL or Pascal or any of the other stuff. I'm quite comfortable in BASIC and I intend to stay with it," he says. "I do not intend to branch out—because I shouldn't be doing it in the first place," he adds, displaying a certain amount of executive guilt.

Paradoxically, most of Golden's programming has been done on the mainframe. In fact there are a number of personal programs on the HP that he's never bothered to transfer to the Apple: a checking-account program, an inventory of his mechanical bank collection, and some football-statistic programs he wrote for his father. (His retired father, a hobbyist statistician, retrieves these programs on the telephone with an Apple that Morley gave him for Christmas.)

He hasn't programmed on the Apple because the need has not arisen. "I have found that between VisiCalc, Desktop Plan, VisiPlot, and ApplePlot—depending on my mood as to which one I want to use—and DBMaster I have solved all of the business problems I have run across without having to go out and author software."

The Company and the Computers

The company now has two Apple IIs in the accounting department. Golden calls them his "Ferraris" because they're "souped up" models, each with an 80-column screen, a Keyboard Enhancer for uppercase and lowercase letters, and a Z80 SoftCard, which converts the Apple to run CP/M-based software.The firm also has one each in the Operations and Marketing departments and one in Golden's office area, where it is accessible to other senior VPs. In addition, five of the company's senior execs now have their own micros at home—all Apple IIs except for a lone Osborne portable.

How much time does the boss spend on his micro? "Are you asking me, or are you asking my wife?" he responds, betraying a certain sensitivity common in personal-computing circles. Golden says he works on the Apple in "fits and starts." It might be as little as three hours in four weeks "but I have also gone for four weeks and spent three

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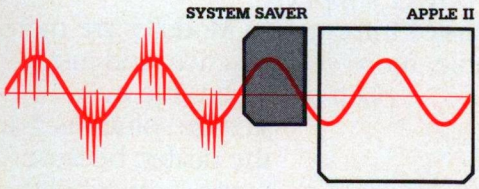

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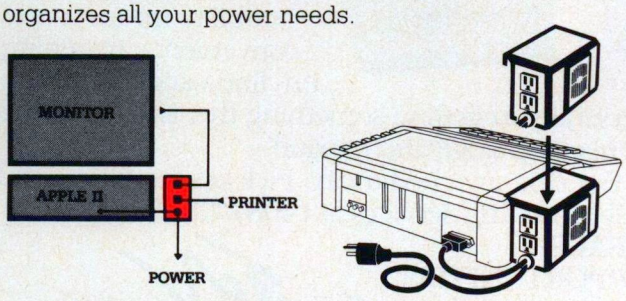

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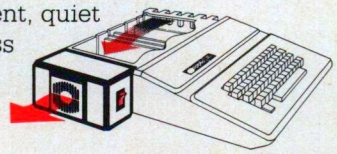

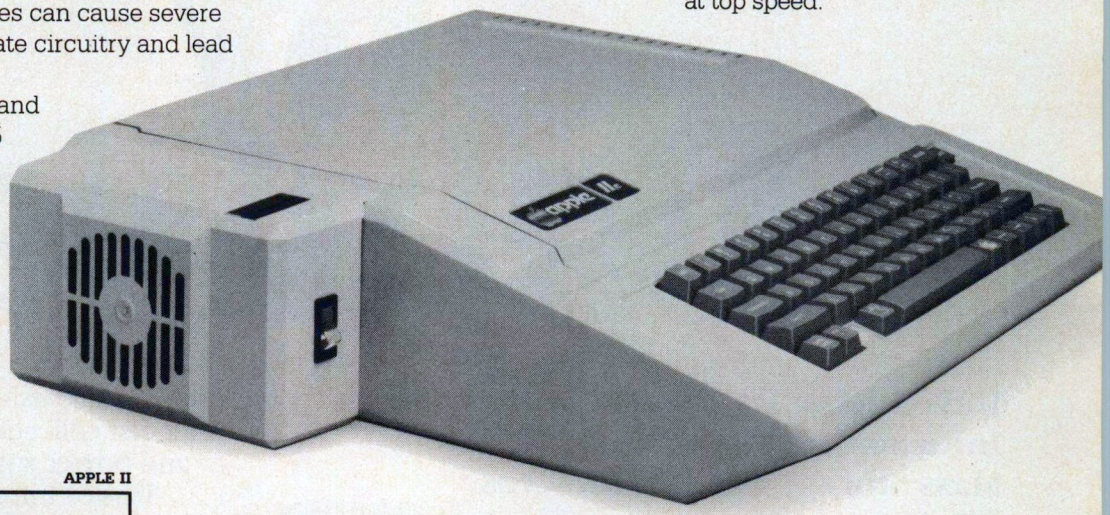

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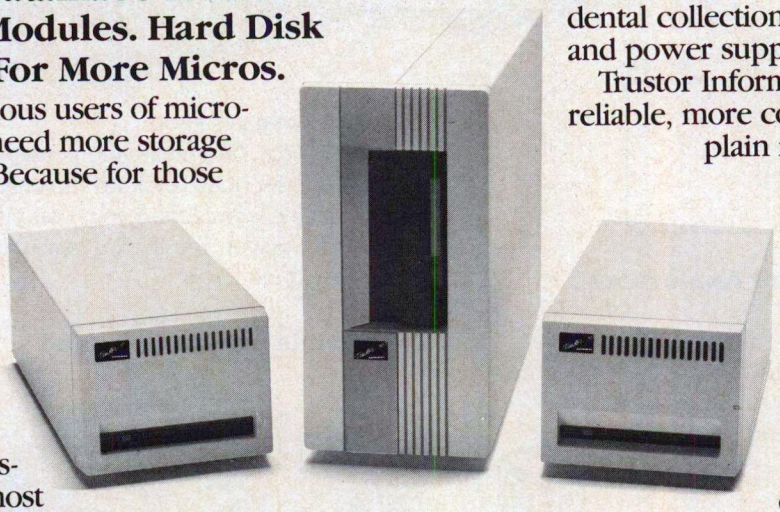

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hours a night and all day Saturday and Sunday on it, depending on what I am going to do or solve. It's very cyclical and depends on my mood and what problem happens to be there that I think I can address.''

After bringing his first Apple into the office, Golden saw it disappear immediately into the arms of his accountants. ''I have been absolutely flabbergasted at how quickly the two senior guys in the accounting department have used it to make schedules for themselves and to do things,'' he says.

''Do things'' is a bit of an understatement. Rob Todd, Golden's chief financial officer and Dave Bohne, the company's controller, immediately loaded all manner of company business onto the micro. Some are things that had been performed on the mainframe but are easier to do on the Apple, while others were done by hand with a calculator—or not at all.

Two important schedules simplified by the Apple are a monthly analysis of fixed and variable expenses that are a part of the company's G&A (General and Administrative) accounts, and a schedule that converts the company's ongoing projects from a tax basis to the percentage-of-completion basis needed for financial reporting and management control. ''That schedule alone is a several man/day effort just in the manipulation of the numbers,'' Todd says. ''The ability to do that on the Apple now cuts it down to literally a couple of hours.'' Todd feels this is something that every contractor in the country has to do. ''Some only do it quarterly and some less often because of the complexity of converting jobs from the tax method to the book method of accounting.'' At M.H. Golden it's now done monthly.

Another significant application that is impossible to guarantee on the mainframe involves the confidential handling of sensitive data such as salary and bonus figures. Routine payroll processing and check writing is done on the Hewlett-Packard, but Todd says the company's salary schedules are kept on the Apple in the form of two floppy disks that can be removed and locked in storage. Only he and Golden have access to that data, which they can work on in the privacy of their homes. This means they are able to keep historical salary data that, in the past, was destroyed because of its sensitive nature and the inability to guarantee its security on the mainframe. ''Even though you have input and output controls and file limitations and those kinds of things, any programmer worth his salt can get around them,'' Todd notes.

Todd, who came to M.H. Golden with a data-processing background in one of the Big Eight accounting firms, says he felt a little guilty when first using the microcomputer because much of the data he was working with was already available on the mainframe system. However, he soon discovered that for the things he wanted to do, the Apple was more effective and easier to work with than the 3000. Guilt quickly gave way to impatience. ''Each time I came across another shortcut to save a file or a quick and easy way of performing a calculation or duplicating some imformation, I immediately thought, 'Gee, I wish I'd known that last week,' '' Todd notes.

Besides Todd, Dave Bohne, the company controller, is another sharp learner. Bohne converted rapidly a number of manual calculations and financial schedules to the office Apple and now has his own Apple at home. ''We gave it to him to save his marriage,'' Morley Golden chuckles. ''He had been working on the Apple here until 10 o'clock at night.'' However, it's a gesture that may have backfired. At home, Bohne's wife has taken over her husband's machine and is using it for word processing. ''I think she's using it more than Dave is,'' Golden says.

They are able to keep historical salary data that, in the past, was destroyed because of its sensitive nature.

Todd believes that three quarters of the company's micro applications involve some aspect of the VisiCalc spreadsheet; the rest is divided among databases, graph-plotting routines, phone-line communications, and straight BASIC programming to solve particular calculation problems. No one in the company has received specific Apple training, because compared with the mainframe—and other micros—the Apples are more approachable and easier to learn.

In assessing the impact of personal computers, Todd points out that what is being done on Apples can be done on the mainframe by using the interactive time-sharing terminals located throughout the

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company's headquarters. He states that "other than those trained in computer programming, the mainframe doesn't lend itself to people trying to become knowledgeable about learning how to program or do anything on it. It seems like it's only for the sophisticated, or at least it has that connotation; with the in-house system you have to know sophisticated programming languages, and you can't really sit down and do the quick and dirty kinds of things [that you can do on the Apple]. Somehow the Apple is less foreboding or doesn't seem as complex, and people are attracted to it in the sense of saying, 'Maybe I'll sit down and try and learn some of this BASIC programming.' "

There are redundancies in the two systems, he says, "but each has its own place. We use the mainframe for number crunching, for its database, and for processing payroll checks, but [the Apples] satisfy a real need for a workstation with personal acceptance." Compared with the Hewlett-Packard, an Apple II is seen as a forgiving, approachable machine "where you don't have the fear that if you push the wrong button the machine will spit punched tape all over the place."

Flourishing Micros

If there is a single key to M.H. Golden's success with computing in all forms, it's the positive attitude toward data processing that pervades the company, the feeling that data processing *isn't* just a necessary evil, isn't something that you did because you *had* to. "We all wanted to make data processing work," Golden says. "We trust it."

In the same vein, the use of personal computers has been supported and spontaneous. "Nothing has ever been forced by management edict," Morley explains.

In the end it is the boss, of course, who sets the tone for the entire organization, and in that sense Morley Golden has created the perfect atmosphere for micros to flourish. "He's a real proponent, and that helps," says Todd. "He's enthusiastic about it, and that can't help but filter down. And when you see him using [the Apple] on a Saturday morning and see that the output and benefit he's getting out of it has a justification, then you take the next step and say, 'How could that help me in what I'm doing?' "

An Apple II is seen as a forgiving, approachable machine.

Todd elaborates on that: "Different people are finding applications that they're doing in their particular areas that they feel could be done more effectively and efficiently on a machine—everything from investment analysis at home to statements of bidding, job budgeting, or job control: We have several project managers who are using the cash-flow/cash-projection routines to manage and control the jobs they are working on, and a lot of people are using them for quasi-personal uses—not the checkbook-balancing kinds of things—but doing a budget or an analysis of a particular investment opportunity or the sale or refinance of a home."

Meanwhile Golden's people continue to siphon projects from the mainframe into their Golden Apples. "We're still trying to evaluate when we cross over the line and abandon the big system," Todd says. "We haven't gotten to that point yet—but we're thinking about it." ✚

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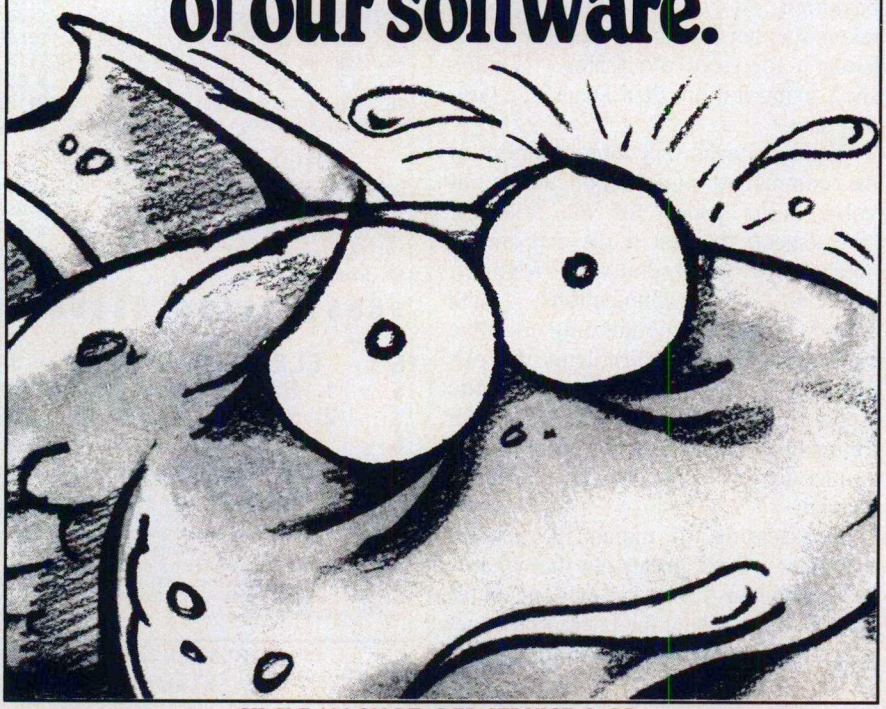

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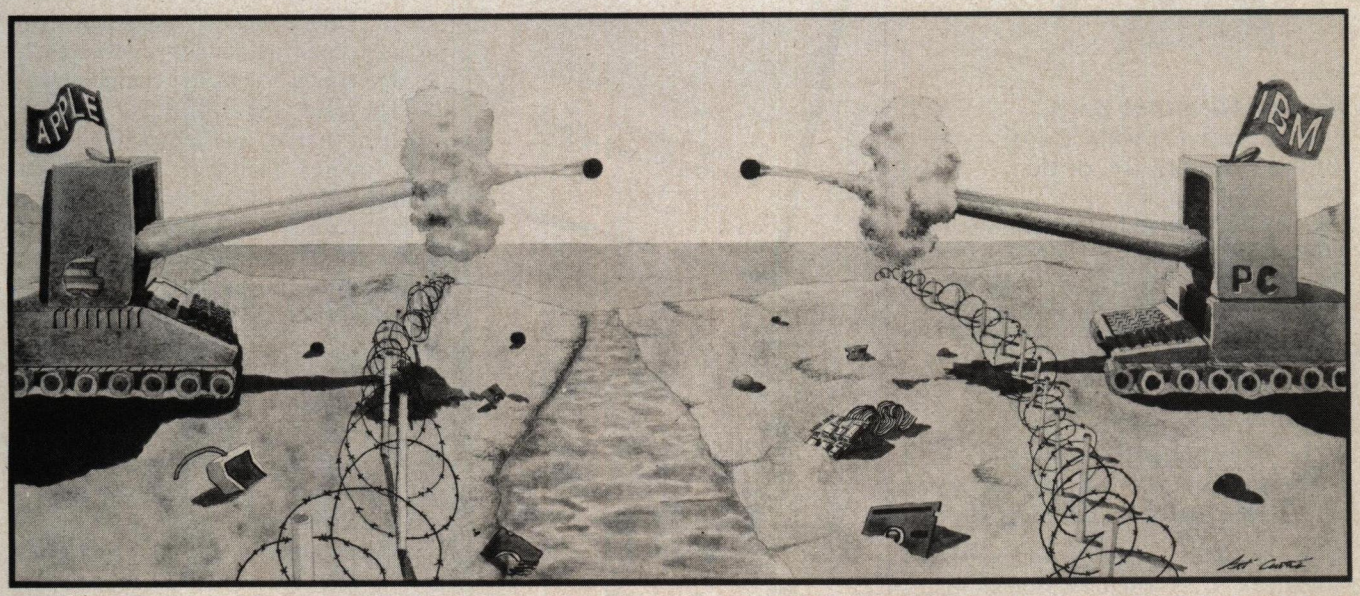

THE APPLE/IBM DIFFERENCE

A war's going on between Apple and IBM, and it's not just a war of competing products. It's a war of competing approaches, styles, and philosophies. The outcome may well determine the type of computers we'll be using ten years from now—and how we'll buy them and how much they'll cost.

The differences between the two companies are apparent as soon as you enter their respective corporate offices. At Apple's headquarters in Cupertino, California, there's an Apple—sometimes two—on every desk. In addition, all employees get an Apple to take home on indefinite loan. Once employees have been with the company for a year, the Apple is theirs to keep.

Conditions are different at IBM's Entry Systems division in Boca Raton, Florida, where the Personal Computer is made. As *InfoWorld* columnist Doug Clapp recently observed, Apple managers have computers; IBM managers have secretaries. The secretaries, in turn, have Selectric typewriters, not PCs. "I don't believe that small computers are as pervasive, or as effective, at IBM as they are at Apple," commented Clapp.

To IBM, personal computing is a business. To Apple, it's a passion.

It's a long-standing tradition in the microcomputer industry for the cobbler's kids to go barefoot. Since start-up companies typically have little money, any equipment generally goes to the technical staff. Managers and clerks make do with manual systems—an arrangement that often continues, through sheer inertia, well past the early financial crises.

Still, IBM is hardly a start-up. It's difficult to believe the company couldn't put a PC on every employee's desk if it wanted to. The fact is, even at Entry Systems, IBMers seem more oriented toward *selling* personal computers than toward *using* them. They work *on* micros; Apple people work *with* them. To IBM, personal computing is a business. To Apple, it's a passion; the business aspect is almost a sideline.

How Did We Get into This Mess?

Both companies entered the personal-computer business reluctantly, though they came from vastly different directions. Apple founders Steve Jobs

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and Steve Wozniak built their first computer, in that legendary garage, for their own amusement. They were surprised when their friends and fellow tinkerers also wanted computers; but, finally convinced, they set out to build a computer that others could use. The result, the venerable Apple II, still sells strongly going into its eighth year, in an industry where a five-year product life span is enviable.

IBM initially spurned the micro market, clinging to its mainframe and minicomputer product lines until it could no longer deny the reality of the personal-computer revolution. Ironically, the success of products such as Apple II compelled IBM to take notice. Once persuaded, IBM devoted its efficient, methodical, calculated approach—and its abundant resources—to developing a personal computer.

The result, the IBM PC, is a masterpiece of market and industry positioning, more than of technological sophistication. In fact, its engineering is notably conservative. The PC used mature, tried-and-true technology that other companies had already surpassed. But the PC matched precisely the needs of its intended market—corporate managers and operators of small businesses.

Moreover, for the first time in IBM's history, the engineering was open. IBM included five expansion slots in the PC and published detailed technical specifications. Independent companies had no trouble developing PC-compatible hardware and software.

It's significant that IBM's technology has consistently lagged behind that of these third-party vendors. For example, the independents offered double-sided disk drives, hard disks, and color monitors for the PC long before they were available from IBM. Similarly, within three weeks of IBM's announcement of the PCjr, two companies announced enhanced PCjr keyboards.

What IBM has built is less a computer than a bandwagon. It has made up for its late entry by actively fostering a market movement. In other words, IBM engineers have developed products that others want to use.

Apple engineers, in contrast, have developed products *they* want to use. They've relied on being brilliant—which is both Apple's great strength and its great weakness. Apple's major products to date—the Apple II, the Lisa, and the Macintosh—are bold, innovative, and technically advanced, almost experimental.

Apple's engineers, trusting their own instincts, have occasionally guessed wrong. For example, Apple made several efforts to develop its own disk drives for the Lisa and the Macintosh. It finally abandoned the project and customized a Sony drive instead.

Most often, Apple's instincts have been right on target, though. That's why the Apple II has lasted so long and why the Lisa and the Macintosh have received so much acclaim. It's instructive that the Apple III—the only product Apple designed for others—is its least successful product.

Apple, designing for itself, tries to find its own engineering solutions to all foreseeable problems. For example, it has actively developed its own proprietary operating systems, starting with Apple DOS for the Apple II. Even when Apple supported industry-standard system options, such as UNIX on Lisa, it published a long list of suggested programming rules for interaction between programs and users.

Brilliant vs. Smart

While Apple was busy being brilliant, IBM was busy being smart. IBM initially offered three standard operating systems (MS-DOS, CP/M, and the p-System) and recently announced a fourth (UNIX). IBM lets the market make the choices and the improvements.

Here is another example. Apple has tried to maintain absolute control over its computers. It has curtailed mail-order distribution channels, patented its technology, and actively prosecuted manufacturers of Apple-compatible machines. So far, IBM has taken no action against the PC-compatibles. In fact, by registering no patents and publishing its specifications, IBM has encouraged imitation.

These actions have made Apple somewhat of an innovative loner, an image the company is promoting in its recent advertising campaigns. In one TV commercial, an Apple user is working alone in a cavernous room ahead of (but also isolated from) a crowded roomful of other computer users. In another ad, a manager has clearly spent all night at the office, working alone with his Lisa computer. He calls home with an exhausted smile to report he'll be back for breakfast.

Apple obviously wants to appeal to people who fit its corporate image—young (baby-boom generation), innovative, and independent. Apple users, the ads suggest, are loners too—they demand brilliance and aren't content to

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use technology that isn't thoroughly up to date.

But brilliance isn't always smart. Consultants Barbara and John McMullen recently observed computer stores that carried both the Lisa and the PC. "Invariably there is a much larger crowd around Lisas than around PCs," they reported, "yet the stores always sell more PCs than Lisas."

Apple has recently shown encouraging signs that it is conscious of industry standards. It has dropped the price of the Lisa dramatically, increased its emphasis of UNIX on the Lisa, and announced support for Rana Systems' innovative new 8086/2, which gives IBM PC compatibility to the Apple. These decisions may not be brilliant, but they are smart.

Take the Rana expansion option, for example. It contains an Intel 8086 coprocessor, 256K bytes of memory, and two floppy-disk drives. All together, they allow an Apple II or IIe to run MS-DOS, the most popular PC operating system. Shortly after Apple blessed the 8086/2, Lotus Development Corporation announced a version of its integrated application program, 1-2-3—by far the best-selling PC software package—to run on Apples equipped with the Rana option. Score one for Apple.

The Macintosh, on the other hand, is unabashedly brilliant, even revolutionary. It's also built from the ground up and ignores virtually every established standard in the business; no color, no cursor keys, no expansion slots, small disk drive, yet another proprietary operating system. "Who cares?" asks Apple. "These are the standards that have alienated millions of potential computer users." A good point.

We need an Apple that's both brilliant and smart to keep IBM from dominating the industry and slowing the pace.

Apple means to set a whole new standard, to steal the standard-setting business away from the IBM PC (which stole it, in turn, from the Apple II). Is this brilliant? Of course. Is it smart? I don't know. It's risky. If it works, it's smart.

Last year, every software company I knew of had boarded the IBM bandwagon. All my programmer friends were working feverishly at their PCs, leaving their dusty Apples in the corner. Even software developers such as Mitch Kapor (Lotus), Dan Bricklin (Software Arts), and Fred Gibbons (Software Publishing), who'd made their first million on the Apple, seemed intent on making their second on the IBM.

Now they're writing for the Macintosh. But they've still got one hand on their PC.

In the mainframe world, a long-standing joke had it that the market consisted of Snow White (IBM) and the seven dwarfs (Burroughs, Honeywell, NCR, Univac, RCA, General Electric, and Control Data). (This was an old joke—way before Apple, even before DEC.) If Apple abandons its brilliance and becomes merely smart, it will surely be destined for dwarfdom.

Conversely, should Apple continue to be brilliant but not smart, it might not survive at all. That would be a shame. We need an Apple that's both brilliant and smart to keep IBM from dominating the industry and slowing the pace. +

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32 chars ea)	READ	24.3	16.3	24.3	83.8
	PRINT/READ	44.2	45.9	45.1	117.1
(442 Sectors, 7 x 500)	APPEND	142.3	142.9	151.1	1231.2
APPLESOFT (100 Sectors)	*SAVE	7.1	16.4	6.4	33.1
	LOAD	5.0	4.0	5.0	23.5
INTEGER (100 Sectors)	*SAVE	7.3	NO	6.6	33.4
	LOAD	4.9	NO	4.9	23.4
BINARY (100 Sectors)	*BSAVE	7.8	18.4	7.3	28.7
	BLOAD	5.8	4.8	5.8	24.5
48K PROGRAM SPACE	APPLESOFT	36,352	NO	36,352	36,352
(With 3 Bufs avail)	INTEGER	36,352	NO	36,352	36,352
	BINARY	36,352	34,816	36,352	36,352
64K PROGRAM SPACE	APPLESOFT	46,592	31,232	45,658	35,162
(With 5 Bufs avail)	INTEGER	46,592	NO	35,162	35,162
	BINARY	46,592	40,704	45,658	35,162
NUMBER OF DOS COMMANDS		37	29	31	28
CLOCK FILE DATING		YES	YES	NO	NO
MANUAL FILE DATING		YES	NO	NO	NO
ONE KEYSTROKE CATALOG		YES	NO	YES	NO
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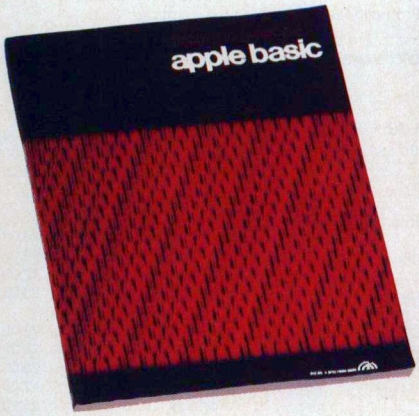

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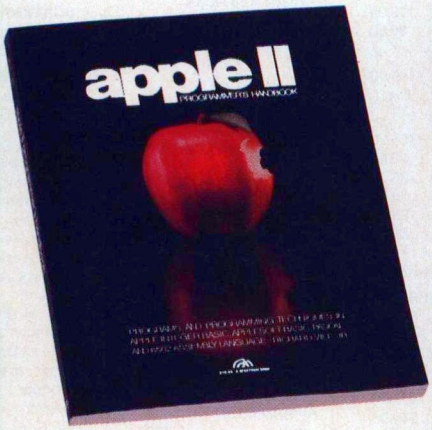

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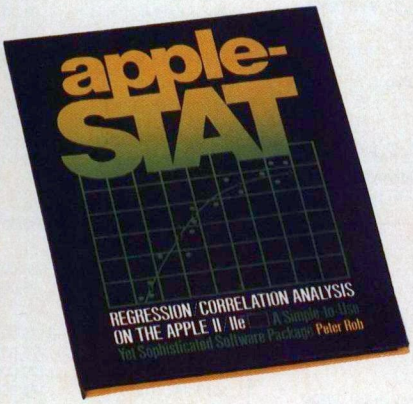

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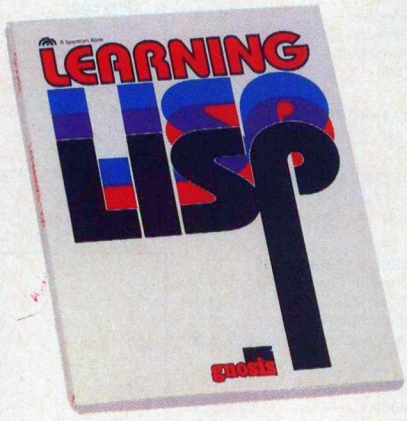

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GAME REVIEWS

LODE RUNNER

Brøderbund Software, Inc.
17 Paul Drive
San Rafael, CA 94903
(415) 479-1170
List Price: $34.95
Requires: Apple II, II Plus or IIe; 48K; one disk drive; joystick optional

CIRCLE 499 ON READER SERVICE CARD

The Bungeling Empire, overlords of the galaxy, plunders planet after planet through a series of oppressive fast-food taxes. The Galactic Commandos are a shadowy group of elite freedom fighters who discover the Bungeling's underground treasure filled with gold. The commandos send a strike team, equipped with fast-firing lasers and even faster feet, to take back the Bungeling Empire's ill-gotten booty.

Lode Runner, a hectic arcade game, puts a laser in your fist and wings on your feet as you become a Galactic Commando. Your mission is to infiltrate the treasury, evade the numerous Bungeling guards, and recover all the chests of gold.

The treasury consists of 150 different screens, or rooms, crisscrossed with brick archways, stairs, ladders, hand-over-hand bars, and brick floors. Numerous chests inhabit each of the rooms.

As a commando, you run across floors and arches, scamper up and down ladders, swing along hand-over-hand bars, bound down stairs, and free-fall gently to the ground in pursuit of the gold. Often, Bungeling guards stand between you and the chests, forcing you to draw the not-so-dreaded laser pistol.

Your laser pistol blasts only bricks, not guards, and then only certain types of brick. You must be literally one step ahead of a guard to drill guard-swallowing pits in the brick. The guard falls into the pit, allowing you to dash by as the guard struggles to climb out.

These pits start to fill in of their own accord after a few seconds, although the time is long enough to let the guard escape. If you drill two adjacent pits, the guard will clamber out of the first, fall into the second, and then get squashed when the pit falls in. Pulverized guards reappear at the top of the room.

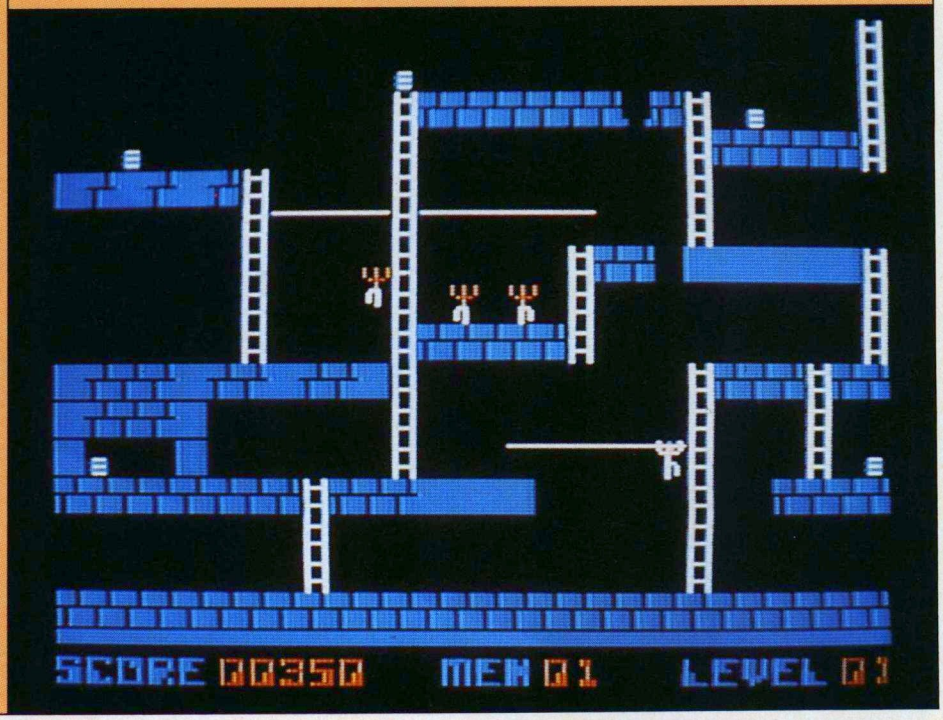
The Bungelings didn't build an empire by being complete bunglers, so although most of the chests lie exposed on floors and archways, some are buried under layers of brick. This situation forces you to drill a series of contiguous pits, leap into the large hole, and drill through the next layer before the pit starts collapsing. Eventually, you can break through the last layer and free-fall to the chests.

You may drill bricks only to your left and right, not underneath your feet. If you stumble into a one-brick-wide pit, you cannot climb out or drill downward. You are completely stuck and must watch the relentless process of the pit filling up, which eventually eliminates one of your multiple lives.

Commando Commands

The controls guiding your commando around the screen are fast and responsive. You can use either a two-button joystick or the keyboard. I prefer the joystick because the keyboard commands seem awkwardly placed.

The I, J, L, and K keys represent moving up, left, right, and down, respectively. The U and O keys represent



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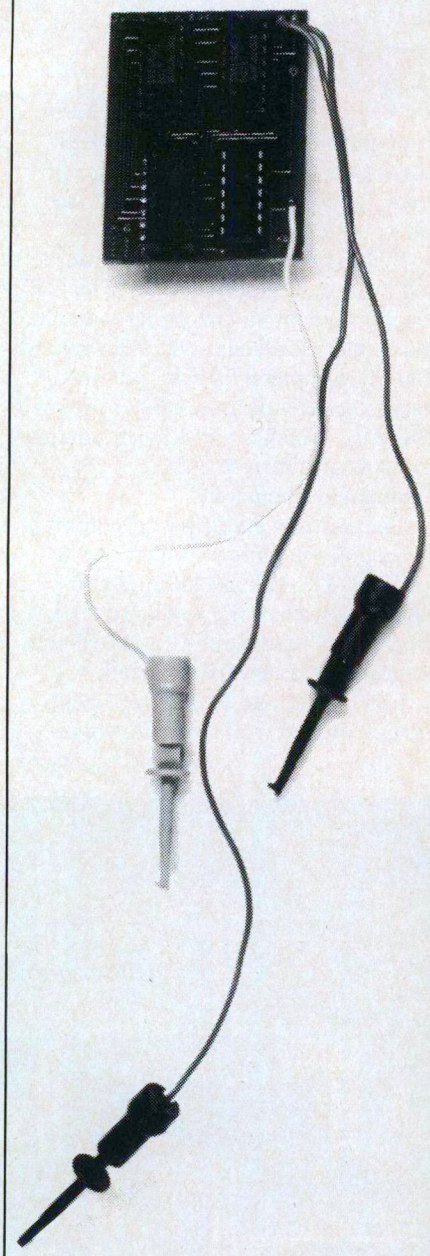

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CIRCLE 167 ON READER SERVICE CARD

drilling left and right, respectively. This configuration possesses the advantage of needing only one hand for operation. It also requires a tremendous amount of digital dexterity. Proficient typists can probably manipulate the keys fast enough to maneuver commandos out of trouble, but fumble fingers are in big trouble.

Meanwhile, your left hand flaps in the breeze. Brøderbund should have at least made the A and S keys control the drill-left-and-right actions, or, better yet, let players choose their own keys. Of course, the joystick solves all these problems.

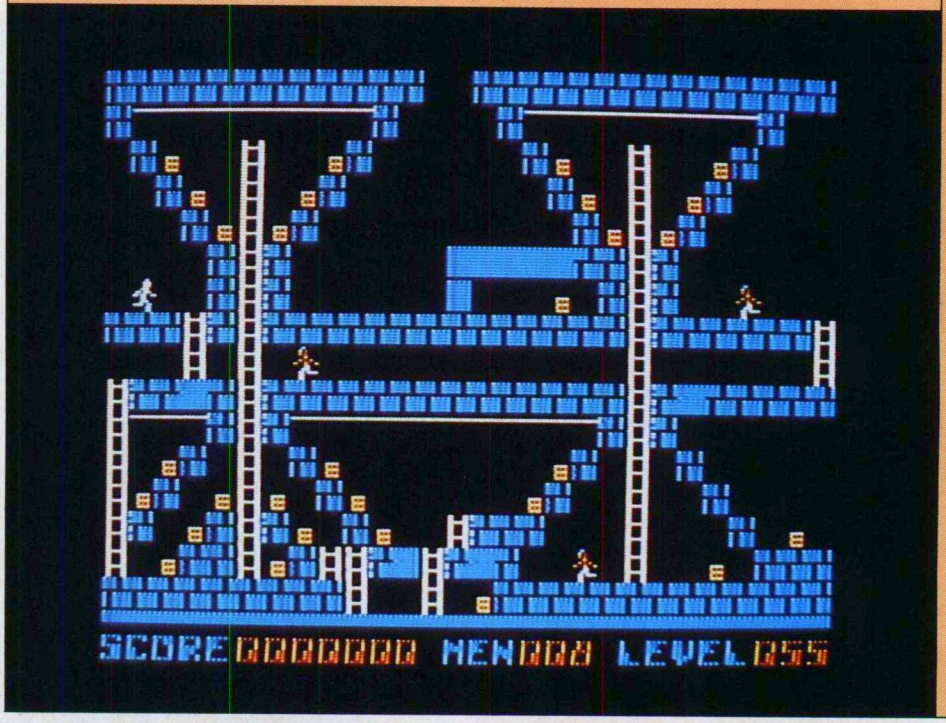
Designer Doug Smith did include several thoughtful commands. Repeatedly pressing the left arrow slows down the overall game speed; pressing the right arrow speeds up the game. Control-X and Control-Y flip the x- and y-axes on the joystick, ESC pauses the game, and Control-S toggles the sound on and off.

Smith also programmed in two "cheat" keys. Lode Runner has 150 screens, which, if played consecutively, can chew up a lot of time. Pressing Control-Shift-N advances you one screen, either for practice, or just to see what the other screens look like. Should you require a few extra commandos to get through the more difficult screens, pressing Control-Shift-P adds additional lives.

The Bungeling guards do a pretty good job of protecting the chests of gold. On occasion they can be absolutely ingenious as they pin you in a corner or catch you between two of them. They also carry the chests around the room while chasing you. On the one hand, the guards carry the chests toward you. On the other hand, you must dig pits aggressively to trap the guards and take away the chests.

Lode Runner resembles a Pac-Man-Berzerk hybrid.

Lode Runner's graphics are simple and functional, in part, I think, to make room for the 150 screens. The commandos are colored blue and white, and the guards are dressed in a tan shirt, white pants, and blue cap. The bricks are colored blue, the ladders and bars white, and the chests look like red-and-white striped barrels.



The sound effects are as simple as the graphics. The game emits a single beep when you run over a chest, sounds staccato beeps when you dig a pit, and whistles like a descending bomb when you free-fall.

The eight-page rules booklet contains relatively clear instructions for playing the game. Only two pages are actually devoted to game instructions, with the balance discussing an interesting option called the "game generator."

As the name implies, the game generator lets you design, alter, play-test, and save your own unique screens. For such a versatile program, the game generator is surprisingly easy to use.

You start with a blank screen and move the cursor around using the I, M, J, and K keys. To place an object, you press one of the ten numbered keys. For example, pressing 3 puts a ladder on the screen. Pressing 7 draws a chest. Changing your mind is as easy as pressing a different key. You can save up to 150 screens per disk.

Lode Runner resembles a Pac-Man-Berzerk hybrid, with lots of running and chasing and a decent amount of shooting. Yet for all the arcade thrills, some screens test your reasoning as much as your reflexes, especially in figuring out how to drill for buried treasure without getting caught in a rapidly filling pit.

While most arcade games are adding color, backgrounds, and other aesthetic embellishments, Lode Runner keeps its graphics simple. This is not necessarily a shortcoming. After all, poor graphics will ruin a game, but unimaginative graphics will not add to a game's appeal.

The game does give you an astronomical number of different screens, 150 to be exact. In addition, you can create an infinite number of your own screens with the game generator.

Lode Runner will keep you running almost indefinitely with its array of fast, fun, and challenging screens. You can create your own games and then fine-tune the speed to match your reflexes. Lode Runner races with excitement and seems destined to be a lode of fun.

Russ Lockwood

DEATH IN THE CARIBBEAN

MicroLab, Inc.
2699 Skokie Valley Road
Highland Park, IL 60035
(312) 433-7550
Requires: Apple II, II Plus, or IIe; 48K RAM; one disk drive
List Price: $35

CIRCLE 500 ON READER SERVICE CARD

Gather 'round, me hardies, to hear a tale about a hoard of pirate gold buried on a lost Caribbean island. Aye, you've never seen a treasure so grand, but beware, mates. Death plagues every path. Only the cleverest of ye adventurers can hope to pass the frightening array of obstacles, find the treasure, and escape the island alive.

Only the cleverest of ye adventurers can hope to pass the frightening array of obstacles, find the treasure, and escape the island alive.

Death in the Caribbean, a high-resolution-graphics adventure game, pits your cunning and creativity against a host of natural and supernatural perils. As you explore a lush, tropical island, you pick up items, evade malevolent monsters, negotiate geological hazards, and discover clues to the treasure.

Your quest starts in back of a house, where you immediately learn that this game differs from other adventure games. In most games, you enter the house, pick up a few necessary items, and begin your adventure. In Death in the Caribbean, however, if you try to enter the house at the start of the adventure, you receive the message *Stay out of the house. We have treasure to find!*

To control your movements, you use the standard array of one- and two-word

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CIRCLE 152 ON READER SERVICE CARD

commands. For instance, typing *look* gives you a description of what you can see. Some of the words, mostly compass points, are abbreviated. For example, typing *n* is the same as typing *north*.

When you use two words, the game expects a verb and a direct object—for example, *unlock door*. Unfortunately, the programming is not as sophisticated as in other adventure games because it ignores any commands in excess of two words. Thus, *unlock door with key* translates as *unlock door*. If you require an indirect object to complete a task, Death in the Caribbean will prompt you for it by asking *With what?* You then respond with the object of the preposition, such as *key*.

You look forward to viewing each beautifully sculpted screen and search for clues as the adventure unfolds before your eyes.

Well, me hardies, I'm off to explore the island. It's got a bloomin' treasure for the taking, and I can leave my black flag at home.

I follow a path north past swaying palm trees and purple flowers until I reach a crossroad. I turn west and come to the top of a cliff. I want to get to the bottom, so I say to myself *climb down*. I'm asked *what*, so I answer *cliff* and immediately plunge hundreds of feet to my doom.

Designers Philip and Bob Hess certainly do not make exploring easy for you. This game is not another follow-your-nose adventure game. When they named the game Death in the Caribbean, they used a capital *D*.

Illustrator Barbara P. Lawrence provides brilliant graphics for the game. You feel as if you are standing on the edge of a cliff or wandering along a treacherous jungle path. You look forward to viewing each beautifully sculpted screen and search for clues as the adventure unfolds before your eyes. Best of all, the graphics appear quickly, taking about three seconds between each screen.

After an untimely demise, you proceed to a final resting spot that you have to experience to fully appreciate. Your fresh grave, complete with a tombstone etched with R.I.P., occupies center screen under a pitch-black sky. Behind the grave, a stone wall marks the edge of the cemetery. A bird sits on the wall. In such eerie surroundings, you expect a vile vulture, or at least an omniscient owl. To keep events in humorous perspective, however, a grinning pelican perches on the wall.

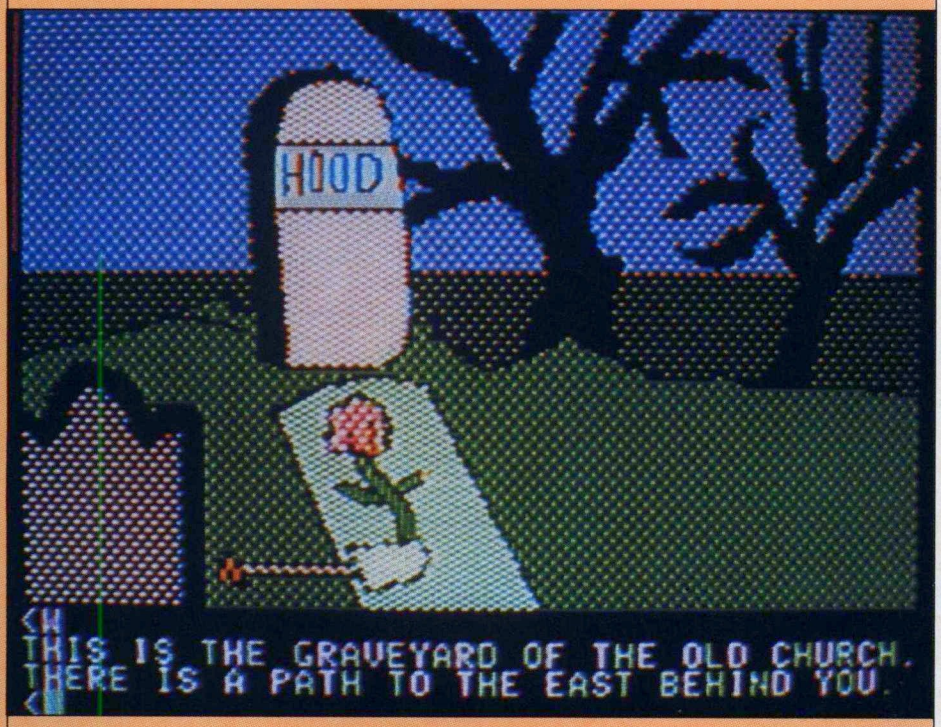
By Blackbeard's eyepatch, me hardies! I have more lives than a cat, and fate returns me to the front of the house. I must be more careful, lest I tempt fate twice.

I walk back to the crossroad, but this time turn east. I wander through the lush countryside and eventually find a wagon. I pull and push the wagon, but cannot move it. I stroll along another path, but it ends in a rock slide. I double back, and eventually reach an old church.

The church proves a pretty sight, with elegant stained-glass windows all around. I try the doors, but they are locked. I break a window, but am admonished *Don't be so destructive. Use violence only when necessary!* A key must be somewhere on this island. I continue to explore.

I find a large hole in the ground at a trail ending in a T junction. A sign stands nearby. It says, *Danger! Man-Eating Ants*. I decide to heed the warning to use violence only when necessary and exit quickly to the south.

Lo and behold, I find a purple box. I say to myself *open box* and then see that *the box is opened. The lining of the box is beautiful!*. I see an object inside that looks like a key. I take the key and head back to the church. I reach the ant hole, but before I can run to the west, the ants burst from the hole. I greet the grinning pelican again.



The game includes detailed graphics for more than just pretty appearances. Unlike pure-text adventure games, Death in the Caribbean requires you to make decisions based on the graphics and text. In several places on the island, the text omits certain important details. For example, you see the key inside the purple box, but the text dwells only on the lining. In another instance, you see logs bridging a crevasse. The text describes the bottomless crevasse but fails to mention the logs.

Unlike pure-text adventure games, Death in the Caribbean requires you to make decisions based on the graphics and text.

The game does not contain extensive documentation, so you can't look for hints in the rules. It gives you a half page of general instructions about commands, how to save up to nine games on the disk, and loading in saved games. You also get a brilliant, four-color map of the island.

The map marks all the trails on the island and provides numerous pictorial hints. For instance, it shows a lethal cliff splitting a trail in two. Given the circumstances surrounding cliffs and falling objects, other hints—such as a crevasse, a swamp with an alligator, and a pasture with a raging bull—should be considered dangerous.

If you have trouble figuring out how to get past obstacles, such as a cliff or an ant hill, MicroLab will answer your questions over the phone.

By Captain Hook's hook, me hardies, 'tis a devious place, this island is. Yet fate returns me to the house again. Only this time, Providence whispers secrets to me, so I can get a better look around. Nay, I cannot reveal them, for then they are no longer secrets.

I pass the rock slide, then the ant hole. I pick up a wagon, a ring, then a key. I enter the church without harming a single section of stained glass and find a trapdoor. Unfortunately, the basement is dark and I need a lantern to see my way around.

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I leave the church and walk to the graveyard, where I come across a grave and a shovel. I take the shovel. After all, you need a shovel to unearth buried treasure. I look at the tombstone.

It reads Hood. I don't recall ever meeting a Captain Hood. Perhaps Robin Hood? Nay, squid brain, what would Robin Hood be doing on a lost island? This is the Caribbean, not England. Palm trees don't grow in Sherwood Forest, and coconuts certainly don't migrate. I must be getting daft. I leave and round up some rope and wood.

Then I see it. It flickers in front of me for a few seconds, then disappears. It is a puffy, white cloud wearing a green hat with a feather. Shiver me timbers! It's the ghost of Robin Hood! Make that Robbin' Hood, for he steals my key.

I bolt from the spot, climb down the cliff, and run along twisting jungle paths. Before I get a quarter of the way across the island, Robin Hood returns and steals my wood. Then my ring. Surely a way exists to exorcise this pilfering poltergeist.

I race across the entire island, passing enchanting scene after scene but find no X marking the spot of the treasure. I do find a green hat with a feather, which makes me think I can dematerialize this specter that spirits away my hard-earned possessions. Unfortunately, I am also in quicksand. I cannot free myself and sink beneath the shifting sands. That blasted pelican comes into view again.

Death in the Caribbean can be downright frustrating sometimes, although you usually end up kicking yourself for making dumb mistakes and omissions. Imagination, resourcefulness, and a touch of logic should get you out of most situations. You're not going to complete the game in an afternoon. This adventure will take a long time to solve.

As with any adventure game, manipulating objects with command words takes some patience and practice. Actions that seem logical are sometimes considered illegal. For instance, you cannot smash a stained-glass window to unlock the church door from the inside.

No skull and crossbones about it, Death in the Caribbean breathes new life into adventure gaming. It embodies all the necessary elements for a successful adventure game—lots of helpful items, vexing problems, a touch of humor, and a ghastly thief—and adds spectacular graphics.

Well, me hardies, I failed to find a single doubloon, which means the treasure still lies buried on the fantasy island.

Russ Lockwood

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*April 1983, Softalk magazine reader survey.
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GAME FEATURE

HI-RES MASTERTYPE

A shoot 'em up game that teaches you how to type

Hi-Res MasterType by Bruce Zweig has to be considered one of the classic Apple software packages. Since 1981, individuals at home and in schools and businesses have taken advantage of this unconventional typing program. If you are unaware of this product, welcome to the high-technology revolution. Simply by playing a fast-paced computer game, you can learn how to type or improve your typing skills. If your keyboard speed or typing rudiments need work, Zweig's program can make you more productive while you have fun.

Hi-Res MasterType is so versatile that it may appeal to you even if you think you don't like computer games. You can control the pace and start at the home row (ASDFGHJKL;) which, as human typing tutors know, is the launching pad for touch-typists. You can also design your own lessons for specific purposes and save them on separate data disks.

The Wizard of MasterType

When you enter MasterType's world, you will learn that letters and words can be dangerous if you fail to find them quickly on the keyboard. You must learn the keyboard in order to win this computer game, which is part of the Space Invaders, shoot 'em up, genre.

After the colorful logo has appeared on the screen, the program asks you to choose from a selection of lessons, including one that you have created yourself. The program disk contains 18 different lessons that become increasingly more difficult. The first three lessons cover the home-row keys. You begin trying to type the single letters that appear in the corners of the screen and proceed to three-, four-, and five-letter words.

The next five lessons review the rows above and below the home row and feature longer words. Lessons 9–13 provide practice, starting with three-letter words and increasing to nine-letter words using all letters. Lessons 14–17 review numbers and shifted and unshifted symbols. Lesson 18 lets you practice words from the BASIC computer language such as FOR, NEXT, and PR#6.

Once you have chosen your lesson, the program takes you to the main menu. Here you can choose to play in the Beginner mode, which is the easiest game, change various options, watch an uninterrupted demo, or quit the entire game.

The Change option takes you to an eight-choice submenu. Choice 1 lets you toggle the Beginner mode, in which words are only one letter long and you don't have to press the space bar after each letter, on or off. Choices 2 and 3 lower and raise the speed goal, respectively, which determines how fast you must type the words. An average initial speed goal is 14–29 words per minute. The fourth option lets you change your lesson or end the game altogether.

For more of a challenge, choice 5 switches from the Cadet mode to the Commander mode. If you don't choose the Beginner mode, you start out as a Cadet, which enables you to see what you type in the middle of the screen. When you're a Commander, the letters don't appear in the center of the screen as you type them. Thus, the game becomes more difficult to play, as your technique develops.

Sound is optional, and you can turn it on or off with option 6. You can change the screen display from all uppercase letters to lowercase with choice 7, a useful option for Apple IIe users who want practice in using the Shift key for uppercase letters.

MasterType in Space

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mode of difficulty, and speed, you move on to the game itself. In the middle of the screen is your home base. Single letters or words in the four corners appear and constantly move toward your base. You must correctly type the word or the letter and perhaps press the space bar in order to blast an enemy. The four enemy "craft" approach your home base until you have typed the letters or words in the appropriate corners of the screen. If you fail to type the correct series of letters quickly enough, your shields, and eventually your home base, will fall prey to the advancing words and letters.

Once you have typed a word or letter, a bolt of lightning destroys that word or letter as it approaches your home base.

Enemy 'craft' approach your home base until you have typed the letters or words.

Remember, though, that you still have three more enemies to zap. More words or letters appear in the corners until the wave of attackers ends or you make too many mistakes.

The game is fast. Like the best arcade games, the parts that require fast action were written in assembly language, and the BASIC portions were compiled.

You score points if you successfully defend yourself—you score the most points when you are in the most difficult mode, the Commander mode. If you do not type quickly or accurately enough, the words will eventually destroy your home base. After each attack wave, you get a chance to practice any words or letters that are especially difficult for you.

Also after each wave, your score appears on the screen. This information diagnoses your abilities and prescribes whether you should work on the same lesson or move on. You can print out this evaluation, which includes your point score, average speed per minute, final speed, number of words typed, words destroyed, mistakes, previous high score, and lesson number. Reported speeds are accurate, with an 8% deviation. You also get a reinforcement message such as Your score is good or A winner.

Creating Your Own Lessons

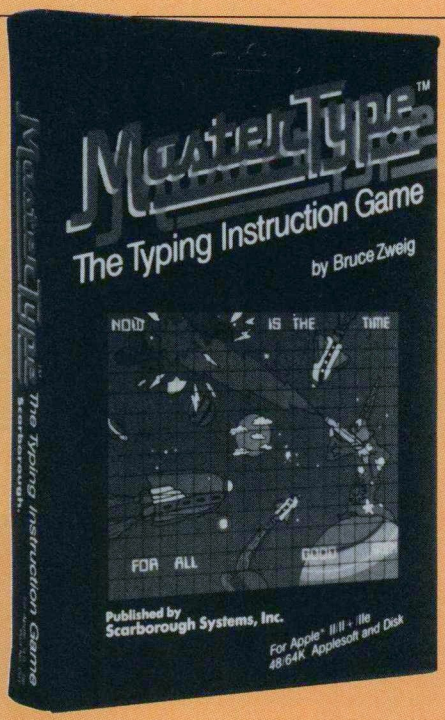
One of the better features of Hi-Res MasterType is that it lets you come up with your own lessons, which gives the program continued flexibility even after you have mastered the 18 lessons the program disk contains. Every time you create a lesson, you must give it a name, add your own instructions or reinforcers, and include 40 different words. Words can contain from 1 to 9 characters but cannot have any blank spaces. The instructions advise you to start each word with a capital letter if you are using a IIe.

You can save lessons on any standard DOS 3.3 initialized disk, so the number that you can create is unlimited. Games are stored as text (T) files and require three sectors of disk space. You won't have any trouble accessing your own lessons from the program disk, and editing or deleting files is simple. For students, we suggest spelling and vocabulary lists as sources of words for games they create, so MasterType can serve as a learning aid in more than one discipline.

We've been using Hi-Res MasterType with students for the past two years, and our initial, positive opinion of it has not changed. If anything, we've found it to be even more effective and enjoyable than we originally thought. It's such a pleasant supplement to regular typing drills.

PRODUCT INFORMATION

Hi-Res MasterType, Version 1.7
Scarborough Systems, Inc.
(originally from Lightning Software, Inc.)
25 North Broadway
Tarrytown, NY 10591
(914) 332-4545
List Price: $39.95
Requires: Apple II, II Plus, IIe, or III in the Emulation mode; 48K RAM; DOS 3.3; one disk drive; black-and-white or color monitor.



We've seen this program in action with students of all ages. Business and word-processing teachers in our region have used it in their classes, as have teachers in elementary and middle schools, where typing is not yet a part of the curriculum. We have also used it in several adult computer classes, and it has always been a popular and effective item.

MasterType seems suitable for elementary students, as soon as their fingers are big enough to cover the home row. The earlier children start learning how to type correctly, the less likely they will be to develop bad keyboard habits later on.

Users of the program will find all important instructions on the screen. If you are using a IIe, you have to turn on the Caps Lock key in order to make your selections from the main menu. After that, you can use either uppercase or lowercase letters, or both.

Since you have to access the program disk whenever you change lessons, you must keep it in your disk drive at those times. Otherwise, this well-protected product can be shared among computers.

Like many current programs, Hi-Res MasterType checks to see if it is operating on an Apple II Plus or IIe, during the start-up process, and behaves appropriately. The program has versions for computers other than the Apple, so it must work with several different types of keyboards, emphasizing the standard typewriter keys. You have to remember that on the II Plus and IIe, keys such as ", ', and @ are in unusual locations.

Versatile Manual

MasterType's 50-page manual contains general typing instructions as well as specific instructions for each computer the program works with. It also provides strategies for playing the game, including ways to avoid getting blown up and methods for scoring bonus points.

New Company for Support

Lightning Software, the original publisher of Hi-Res Master type, was very helpful to its customers. Program disks were under warranty for 30 days and were replaced free of charge if problems arose. After 30 days a replacement disk cost $5. Registered users also received a MasterType newsletter informing them of new lessons or enhanced programs.

In September 1983 Scarborough Systems purchased Lightning Software. We do not know of any specific changes that this company has made in the support of MasterType.

Living Legend Lives On

We highly recommend this product. It has become easier to use since its initial release, the manual is more comprehensive, and the price is lower. Enhancements such as these are tough to beat and should assure that Hi-Res MasterType will remain on the best-seller list for years to come. +

PRODUCT NEWS

Electronic Playground

Electronic Playground is an educational program designed for children ages 3-8 years. It is divided into three parts: Matchbox, a three-part game that allows matching of shapes, uppercase to

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*Modems supported: Hayes Micromodem II or IIe, Smartmodem 300 or 1200 (with Apple Super Serial Interface), Novation Apple-Cat II and compatibles of these.

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lowercase letters, and numbers; Magic Blackboard, a drawing and coloring program; and Heidi's Program, which offers a flood of colors and sounds when you press different keys.

The program features a Hi-Res Picture Catalog that allows you to save, load, and delete pictures using a joystick. It also uses icons. *(List Price: $24.95)*

Requires: Apple II, II Plus, or IIe; 48K RAM; one disk drive; joystick

Software Entertainment Company
537 Willamette
Eugene, OR 97401
(503) 342-3495

CIRCLE 504 ON READER SERVICE CARD

Basketball Computer Game

Boston Celtics star Larry Bird and Julius Erving ("Dr. J") of the Philadelphia '76ers helped programmer Eric Hammond create a game that simulates a real-life basketball experience. Called Julius Erving and Larry Bird Go One-on-One, the disk-based game reproduces these players' images and captures their moves and strategies.

The game includes a 24-second shot clock, a game clock, a scoreboard, plus a backboard that shatters when a player makes a ferocious dunk. Players can choose one character and play against the computer, or two players can play against each other. Players can play either for a set length of time or until they reach a set score. (*List Price: $40*)

Requires: Apple II, II Plus, or IIe; 48K RAM; one disk drive; joystick

Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
(415) 571-7171

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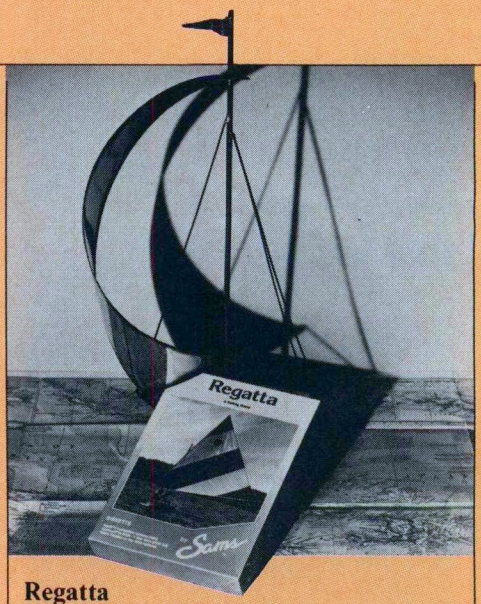

Regatta

The action in Regatta (for one or two players) begins at one of four lakes on a course marked by three buoys. Each player sets sail and controls the tiller to maneuver through the course. A clock,

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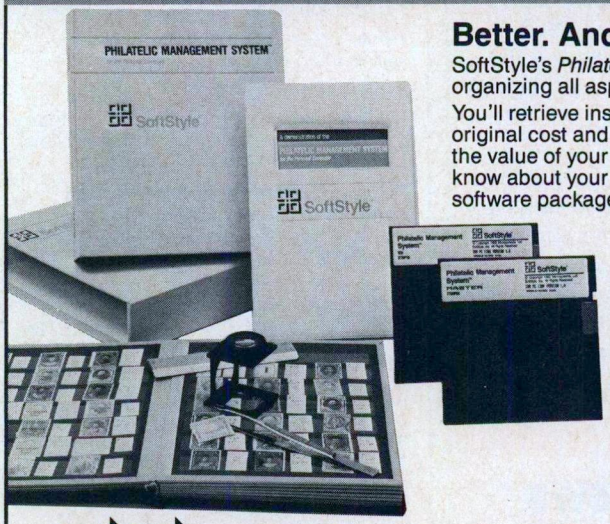

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visible on the screen, tracks elapsed race time, and the program saves record-breaking times for future reference. As in actual sailing, a penalty accrues to a player's time whenever the sailboat hits a buoy or runs aground.

An illustrated manual describes strategies and explains basic nautical terms such as running, reaching, tacking, and yawing. (*List Price: $29.95*)

Requires: Apple II, II Plus, or IIe; 48K RAM; Applesoft; DOS 3.3; one disk drive; game paddles or joystick optional

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Indianapolis, IN 46268
(317) 298-5400

CIRCLE 506 ON READER SERVICE CARD

Four Educational Games

Ten Little Robots is designed to introduce children ages 2-7 to the computer. It includes five different learning games: Little Robot Story, a nursery tale that introduces subtraction and prepares children for reading; Robot Letter Match; Count the Robots; Robot Addition; and Robot Sketch, a painting game.

Ships Ahoy is designed for children ages 5-13. You sail your ship across the sea and avoid a treacherous mine by correctly answering math problems. You can choose whether to add, subtract, multiply, or divide and can select a difficulty level. The package includes three other games: Mine Sweeper, in which you use a joystick to detonate the mine whose value correctly completes an equation that appears at the top of the screen; Treasure Hunt, a maze game; and Sailing Sketch, a painting game.

Race Car 'Rithmetic is a math game for one to four players. Players compete on their own level in a race to the finish line. You can select your own operation (addition, subtraction, multiplication, and division), difficulty level, and time factor. It also includes an arcade-style Race Car game.

Funbunch, a language-arts game, is available on three levels: grades 1-6, junior-high school, and high-school to adult. Each level includes over 2000 words and phrases, and you can also enter your own. It includes a Computer Doodle drawing game. *(List Price: $39.95 each)*

Requires: Apple II, II Plus, or IIe; 48K RAM; one disk drive

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Jury Trial II
Jury Trial II, an advanced version of Navic's courtroom strategy game Jury Trial, features an enriched cast of characters supported by individual dossiers in the accompanying documentation. Among the new personalities are Mr. Wallbanger, the town drunk, and the voluptuous Linda LaVerne, a flirtatious nightclub dancer.

Among the new personalities are Mr. Wallbanger, the town drunk, and the voluptuous Linda LaVerne, a flirtatious nightclub dancer.

Players, in their roles of prosecutor and defense attorney, attempt to stack the jury by choosing candidates biased in favor of their own respective sides, but even though the jurors exhibit favoritism, the trial is won or lost by the tactics of the competing attorneys.

Players interview the venerable county sheriff in order to develop case evidence, and during the trial the computer acts as judge. Players are reassigned and challenged with a different case every time they play the game. (*List Price: $49*)
Requires: Apple II, II Plus, or IIe; 48K RAM; one disk drive
Navic Software
12150 Captain's Landing
North Palm Beach, FL 33408
(305) 627-4132

CIRCLE 508 ON READER SERVICE CARD

Crypt of Medea
It's a stormy night and you find refuge in the only available shelter, an eerie mausoleum. As you hear the gate slam shut behind you, your worst fears materialize—you are now trapped in the Crypt of Medea.

Thus begins an exciting new high-resolution adventure program. Crypt of Medea takes you through dark travels in an underground of terror. You must pass through countless hidden passages and secret rooms if you ever want to see the light of day again.

But beware! All of the horrors you ever imagined await you at every turn. Avoid the ghoulish obstacles of the forbidden chambers or face eternal entombment. The program features simulated 3-D color graphics plus graphics and text animation. It also has Mockingboard capability, which allows the game to "talk" to players, although a Mockingboard is not necessary to play the game. (*List Price: $34.95*)
Requires: Apple II, II Plus, IIe, or III; 48K RAM; Applesoft; one disk drive
Sir-Tech Software, Inc.
6 Main Street
Ogdensburg, NY 13669
(315) 393-6633

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At crucial points in these stories, readers, by responding to a list of options the computer supplies, make real-life decisions that directly alter the plot. Each title has from 15 to 50 possible endings. The computer refers to the reader by name throughout the story; it also permits the reader to put in up to nine bookmarks for later exploration. The following titles are available now, with more to come in future months: *Island Love* by Brandy York; *The Mystery of Bat Cave* by Anne Schraff; *Approaching Terminal Station* by Richard Robinson; and *The Riddle of the Redstone* by Ann Marie.
(*List Price: $30 each*)
Requires: Apple II, II Plus, or IIe
Home Computer Software
1307 South Mary Avenue, Suite 209
Sunnyvale, CA 94087
(408) 735-8400

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Star Search
In Star Search, Pluto star base receives a signal from the direction of Epsilon Eridani and the players have their mission. Each player is captain of a ship and must choose crew and supplies to search for the signal's origin. You can gather information by flying probes through planets' atmospheres or even land a pinnace with crew members.

You can enter an asteroid belt to conserve fuel, but be ready to dodge meteoroids or destroy them with your laser gun. You win the game by managing your resources well and making discoveries. (*List Price: $45*)
Requires: Apple II; 48K RAM
Earthware Computer Services
P.O. Box 30039
Eugene, OR 97403
(503) 344-3383

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Sorcerer
Sorcerer is the second release in Infocom's Enchanter series of fantasy adventures in the mystic arts. Players advance toward their goal through the use of magical powers that they acquire along the way. The program can understand a vocabulary of more than 1000 words.

The package contains the game disk; a user manual, *Popular Enchanting Magazine*; a colorfully illustrated rotating data wheel, called Creatures of Frozbozz Infotater; and a holding pouch. (*List Price: $49.95*)

Players advance toward their goal through the use of magical powers that they acquire along the way.

Requires: Apple II, II Plus, or IIe; 48K RAM; one disk drive
Infocom, Inc.
55 Wheeler Street
Cambridge, MA 02138
(617) 492-1031

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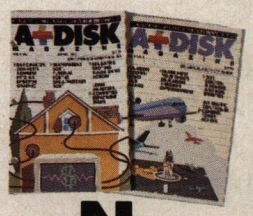


A collection of ready-to-run programs and documentation for Apple computers makes its debut.

It had to happen: With all of the computer magazines vying for your attention, now there's a magazine for your computer to read. *A+ Disk Magazine*'s premier issue appeared in computer and bookstores in mid-March. The product, as its name implies, uses a magnetic disk instead of ink and paper to convey its message. The first edition includes ten ready-to-run programs for Apple II, II Plus, and IIe computers, together with a complete manual.

It represents, according to its designers, an entirely new way for authors to reach the owners and users of Apple II computers. "This is not a magazine on diskette," said Editor Morris Effron. "The printed page is still the best way to convey information for human eyes. The point of *A+ Disk Magazine* is to convey software in the easiest, quickest, and most efficient manner possible."

The monthly *A+ Disk Magazine* was developed by Ziff-Davis Publishing, publisher of *A+* magazine and many other popular "conventional-format" magazines devoted to computer users. The first issue had a press (and disk) run of 20,000 copies, which will run on any Apple II, II Plus, or IIe or compatible machine with at least 48K RAM, with Apple DOS 3.3 and one disk drive. The magazine sells for $29.95 at computer and bookstores ($119.95 for a six-issue mail subscription). Current plans call for nine issues per year.

"We took a good, long look at the software on the market for the Apple and at the means of distributing that work to the user," Effron said. "One of the things we found was that the less-expensive programs—no matter how worthy—often were not reaching their markets. We look at the *Disk Magazine* as one way for small programs—works that might not otherwise achieve commercial success—to be packaged together, duplicated, and distributed as a unit," he said. "We can all share the tremendous costs of production.

"This way the product is out there, and the author can make some money,"

The product, as its name implies, uses a magnetic disk instead of ink and paper to convey its message.

Effron continued. "And the user receives a similar benefit: a collection of programs that is worth more than the sum of its parts."

The magazine will actively seek contributions from readers for upcoming issues. For details concerning submission, send for the "Software Submission Plan," *A+ Disk Magazine*, Author Submission, One Park Avenue, New York, NY 10016. Authors are paid on a per-copy royalty plan, based on sales. "We want our readers also to be our authors," Effron said. "They will determine the content and the success of the magazine."

"The purpose of the *Disk Magazine* is not to supplant *A+* magazine," Effron said, "but rather to complement it. We'll be able to include long programs that could not be listed in print, and our software will be debugged and ready to go."

Similarly, Effron said, the package will not be in competition in national distribution. "Our programs will complement these packages as well," he said. Effron said he expected such products as VisiCalc templates to be in future editions.

The *Disk Magazine* intends to offer a diverse selection of software in every issue, divided into five software categories: Business, Personal, Education, Utilities, and Games. Plans are to have at least one program in each category in every issue.

Among the features in the March issue, you'll find the following:

- **BUSINESS**

Loan Analyzer: Evaluate alternative fixed-payment mortgage and loan agreements, with or without balloon structures.

Bar Charter: Enter your data, bar captions, and graph title on a preformatted screen.

- **EDUCATION**

Transparent Sort: The quickest way to understand the Shell/Metzner sorting algorithm is to watch it happen step by step. Use an electronic blackboard to view the internal workings of the program at any speed.

Bank It: Designed by educators, this game offers entertaining reinforcement of essential arithmetic skills.

- **GAMES**

Sea Battle: It's a naval engagement on the high seas, and you're Supreme Commander.

Pyramid Match: The computer presents you with ever-larger numbers that you have to repeat. ✚

▸ LANGUAGES/BY SUSAN R. WOLINER

PICKING A PROGRAMMING LANGUAGE

Are you a beginning programmer? Here's some background information that will help you choose a language.

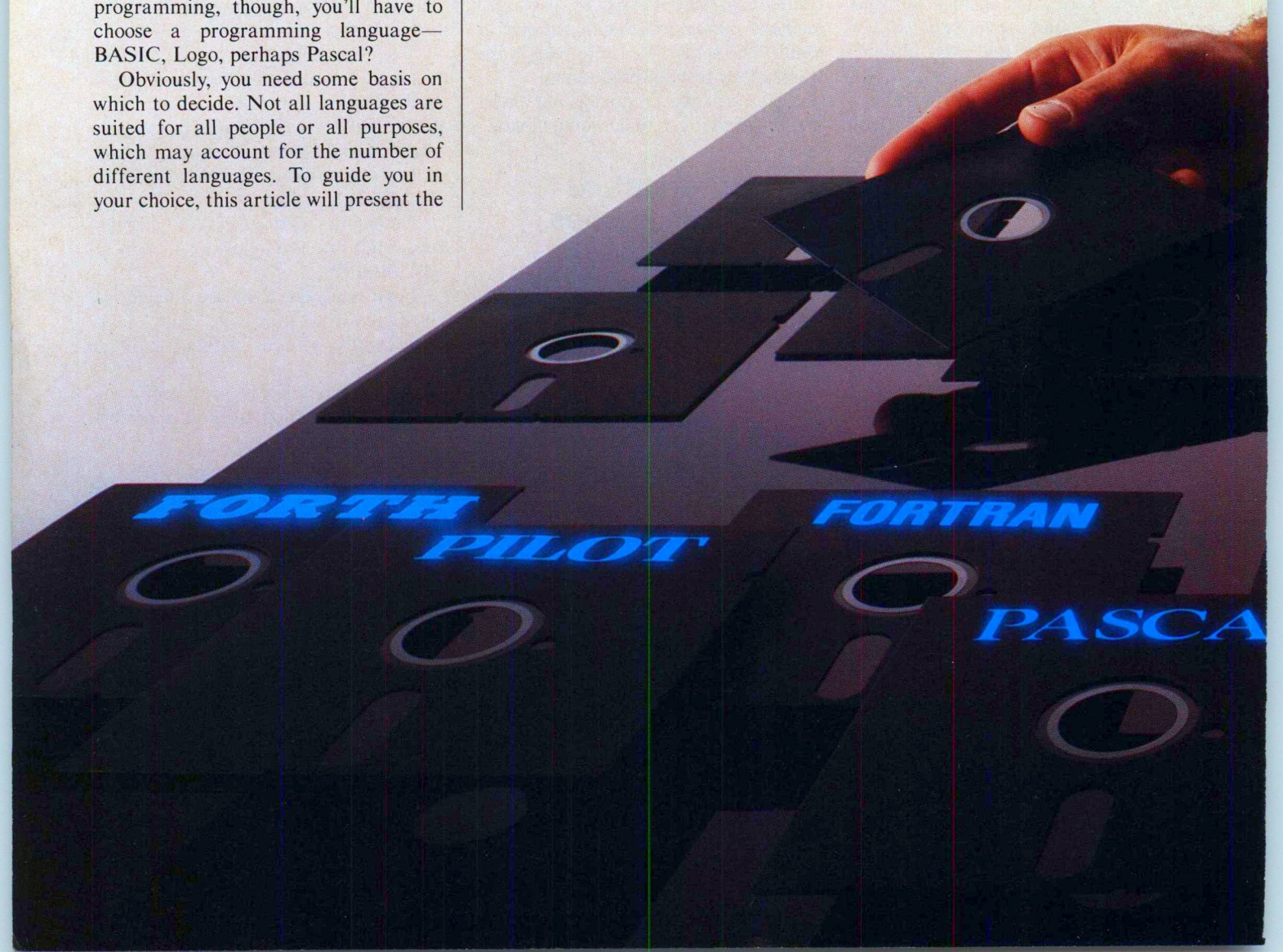
Have you been buying software packages for your Apple and wondering whether there is more to computers than what commercial application programs offer? Have you ever considered what it might be like to try writing your own programs? After all, people who write their own programs, even very small ones, get a good deal of satisfaction from meeting the challenge of doing so. If you are ready to try programming, though, you'll have to choose a programming language—BASIC, Logo, perhaps Pascal?

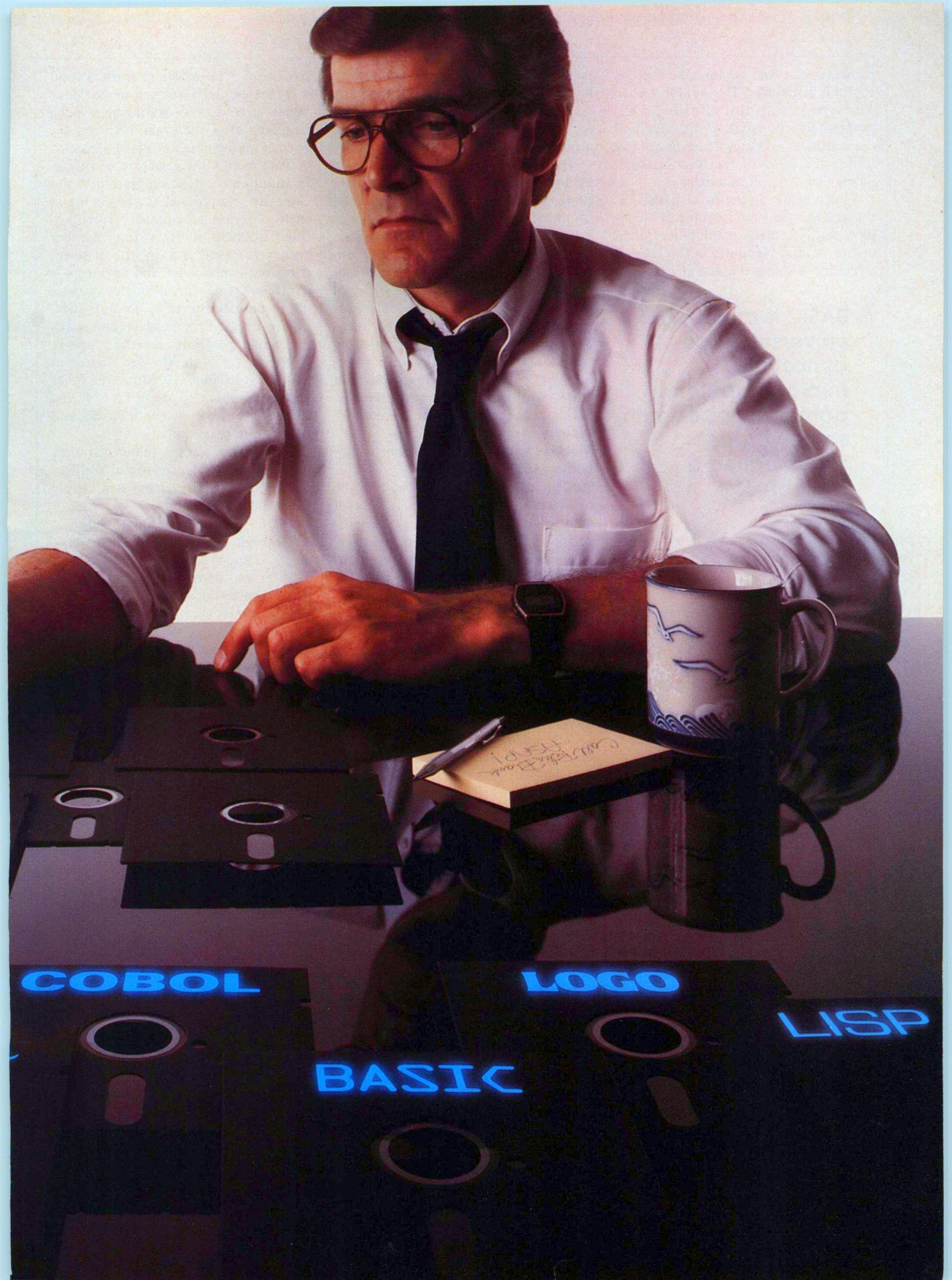
Obviously, you need some basis on which to decide. Not all languages are suited for all people or all purposes, which may account for the number of different languages. To guide you in your choice, this article will present the strengths and weaknesses of each of the major programming languages for microcomputers.

BASIC Is Basic

Probably the most popular programming language for beginners and hobbyists is BASIC, which is an acronym for Beginner's All-Purpose Symbolic Instruction Code. It was invented around 1964 by then Dartmouth professors John G. Kemeny and Thomas Kurtz to allow novices, particularly their students, to try their hand at programming without getting overly involved with syntax and format. You can get your feet wet without first having to fuss about the different types of variables (integer, floating-point, string), forms of output (e.g., the number of digits in numerical answers), and the like.

BASIC is almost universal, since almost all microcomputers come equipped with some version (often called a dialect) of it. It uses familiar symbols, most notably the English alphabet and the ten digits 0 through 9, and most dialects have respectable graphics capabilities. Many of the commands use suggestively familiar state-

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LISP
BASIC

ments, words, and commands, such as PRINT, LIST, and IF . . . THEN . . . . You type in each line of code for the program on a line that you number, and the computer executes the program following the order of the line numbers, unless you direct it otherwise.

If one of the strengths of BASIC is the relative ease of learning it—coupled with its ready availability—then one of its disadvantages is the lack of structure of many dialects. Critics say

BASIC is almost universal, since almost all microcomputers come equipped with some version (often called a dialect) of it.

that most versions of this language actually encourage sloppy programming style, which in turn makes such programs harder for others to follow or debug (locate errors). Despite this criticism, BASIC is the de facto standard language for micros, and, hence, it is frequently the language that users of Apples and other personal computers learn first.

Since computers that are programmed in BASIC have to convert typed-in programs to machine language—either binary or hexadecimal numbers—BASIC is called an interpreted language. As with other such interpreted or "high-level" languages, BASIC programs tend to run relatively slowly. For most beginners, however, BASIC's speed is more than adequate. Furthermore, BASIC compilers, software that converts ("compiles") your code to machine language before you run it, can speed up your programs.

Do not expect a BASIC program you write on an Apple to run on another brand of computer. To convert your programs, you have to know the idiosyncrasies of each machine and which commands are comparable. Converting small programs isn't a big problem, however.

Who Likes Logo?

Logo is another language that is easy to learn, and many consider it a better tool for children—and even for adults—than BASIC. This ease of learning is the main reason why Logo, invented in the 1970s, has become so popular in elementary school—with both the kids and the teachers. Many people identify Logo by its "turtle" cursor, which children learn to move around the screen of their monitor.

Dr. Lawrence B. Golden, Associate Professor of Physics at Pennsylvania State University and an experienced computerist, even recommends Logo as a first language for adults, in preference to BASIC. With all computer languages, he explains, the most important consideration is the learning of algorithms, procedures to solve problems or reach goals. With Logo you can focus on algorithms without getting involved with much else. The language is structured yet easy to learn, and it provides quick positive reinforcement. Like BASIC, it is on the slower side and not well suited for complex calculations.

Machine Language or Assembly Language

Computers do not operate in the realm of words, but rather in that of numbers—in either binary or hexadecimal form. Machine language, which uses these numbers for programming, is the natural language of the computer. Working in machine language is very difficult, too difficult for most novices.

Assembly language is a language of mnemonics—memory devices—for machine language. It is easier to learn than machine language, but beginners should avoid it.

Why would anybody learn or use assembly language instead of something simpler? The reason is speed. As a low-level language close to the natural language of the machine, assembly language executes quickly. This asset makes it the language of choice for some arcade games, word-processing programs, and database programs. Some programmers prefer to write in a high-level language such as BASIC or Pascal, however, and then use a compiler to convert their programs to machine code. Compiled programs tend to be harder to modify than uncompiled ones, which is why not all high-level-language programs are compiled.

Parlez-vous Pascal?

Pascal, another high-level language, is popular, particularly at universities, as a first language, mostly because it is a structured language. That is, Pascal programs consist of smaller subprograms. Programming instructors use Pascal to teach good programming techniques, and its structure makes it easier to debug than BASIC. It has a speed advantage over BASIC, although BASIC is a bit easier to learn. Pascal was created and developed by Nicklaus Wirth around 1970, and he named the language after the great 17th-century French mathematician Blaise Pascal.

Part of the fine structure of Pascal, its requirement that programmers declare variable types at the beginning of each program, facilitates error-spotting. Because it is a fine number cruncher, Pascal is a favorite of scientists, mathematicians, and engineers—it offers greater precision for various mathematical functions than BASIC usually does. Many database and word-processing programs for the Apple—PFS File, for example—are written in this versatile language. Moreover, other languages, such as FORTRAN and COBOL, are compiled with Pascal, and Pascal editors are popular.

Pascal has several major variants, but the UCSD (University of California at San Diego) version is probably the standard for micros.

COBOL—For Businesspeople Only?

COBOL (Common Business-Oriented Language), invented around 1960, is considered best suited for business applications. This reputation stems from its excellence for maintaining accounting files and the like. COBOL is wordy and, consequently, somewhat difficult. Because of its extensive formatting capabilities—and the attendant detail—and the simple way calculations work—with all the limitations that this simplicity implies—COBOL tends to polarize computer users into lovers and haters of this language. Although COBOL is criticized as archaic, there is little chance that it will die soon. In fact, COBOL programmers are in greater demand than are programmers in any of the other popular languages. Not only is COBOL good for business uses, but all the COBOL programs that are already available perpetuate the language's ex-

Programming instructors use Pascal to teach good programming techniques, and its structure makes it easier to debug than BASIC.

istence. In view of its demands, COBOL is probably not going to be your choice of a programming language unless you plan to write business software.

FORTRAN—for Whom?

FORTRAN, which dates from the 1950s, stands for Formula Translator. As its name suggests, this language—unlike COBOL, for instance—is well suited to the calculating needs of the scientific and mathematical communities. Like COBOL, FORTRAN has its detractors who consider it a dinosaur. But, as with COBOL, the mass of FORTRAN programs and scientific subroutines that exist means that this langauge is not about to disappear. FORTRAN offers little in the way of graphics, so if this feature is important to you, you ought to forget it. On the other hand, this language has rich formatting capabilities to generate the kind of output you want, provided you are willing to learn how to do so. Traditionally, it has been the first language university students learn, although Pascal is more in vogue nowadays.

Forth—for You?

Forth is another programming language that claims many adherents and is available for personal computers, including the Apple. It was invented about 15 years ago, making it one of the newer options. This language is much faster than BASIC, and has been described as a "high-level assembly language" well suited for systems programmers.

This language's distinction is the control it gives you, particularly in that you can customize the language with your own commands.

Where Forth really excels—and its raison d'être, at least initially—is its use in controlling electronic and laboratory equipment such as automated movie cameras, portable monitors, and especially telescopes. In fact, it is considered the standard control language for astronomical observatories worldwide. This language's distinction is the control it gives you, particularly in that you can customize the language with your own commands. Forth adherents are ardent in its promotion, but not many people program in this language. The language is still young, and it could catch on more in the years ahead. One Forth package available for the Apple is called Graforth.

Plus Lots of Others

Since computers have a well-established tradition of number crunching, it is not surprising that many specialty languages shine in this kind of application. Worthy of mention are APL, PL/I, LISP, and muSimp. APL is a terse language with unusual symbols. It is not easy to learn, but you'll find it versatile if you do learn it.

PL/I was invented as an all-purpose language, but it is actually quite specialized.

LISP (from List Processor) and muSimp are associated with artificial intelligence. For instance, programs such as muMath can do symbolic math, such as algebra and calculus (differential and integral). Programs in these languages can work with variables without assigned values, something that BASIC and the other languages we've touched on cannot do.

Ada is a language you will be hearing more about. Named after the 19th-century countess and mathematician

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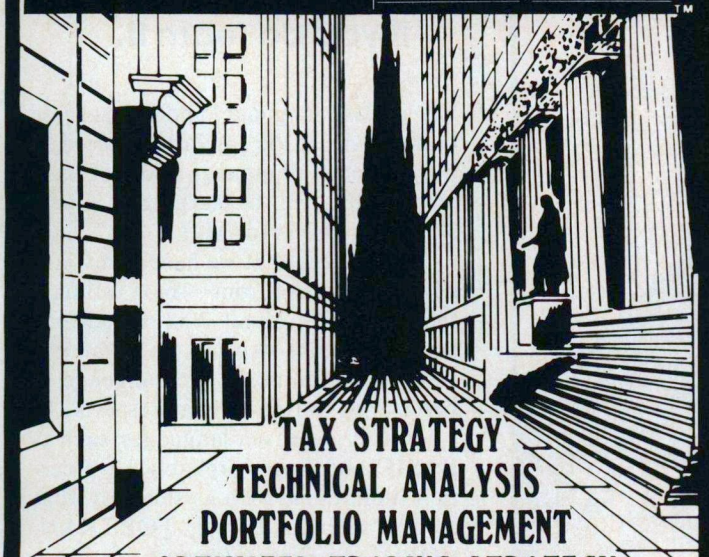

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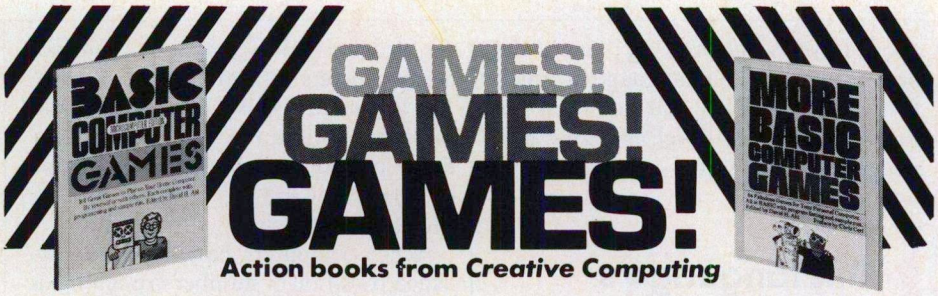

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Ada Lovelace, it is being developed under the auspices of the U.S. Department of Defense. Because of the imprimatur of the DOD, this language will attract programmers, even if only professionally.

C, even more than Forth, produces code that executes rapidly. It is a structured language, frequently coupled with the UNIX Operating System. Many computer professionals think that this one will be a biggie.

PILOT is attracting interest not because of its computational features, one of its weakest areas, but rather because it is good for dialogues and computer-aided instruction, especially with children. Its most typical use is in question-answer situations involving word comparisons.

PROLOG, invented around 1970, merits mention because the Japanese have chosen it as the standard for their "fifth-generation" computers. Its name stands for Programming in Logic. It is

APL is a terse language with unusual symbols. It is not easy to learn, but you'll find it versatile if you do learn it.

not an easy language, and it has some quirks. Still, if the Japanese succeed, it may become a language many of us—or our kids—will be learning.

So Which One Is for Me?

You can see that we have many languages to choose from—some estimate the number at about 200! Which one you should use depends on what you want to accomplish. No language is better than the others in all respects. As a general rule, easier languages, such as BASIC and Logo, probably have certain limitations, such as slowness, that others, such as Pascal, FORTRAN, COBOL, or Forth overcome.

The important point in starting to program is just that—starting. Learn something about programming in general, and not just the specifics of one language. Seek out some introductory books or magazine articles. The satisfaction of solving problems, even very simple ones, makes programming a rewarding task. It may not always be easy, but it will be worth it! ✚

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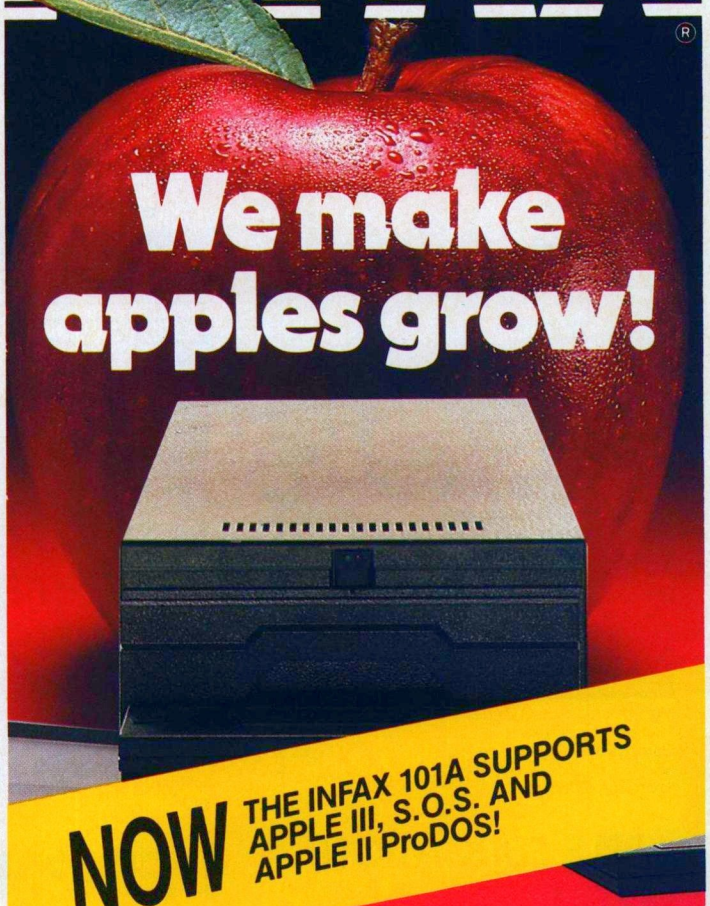

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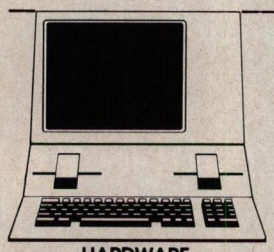

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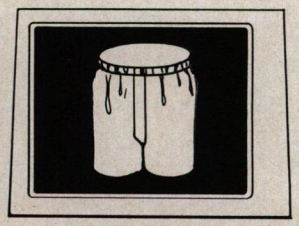

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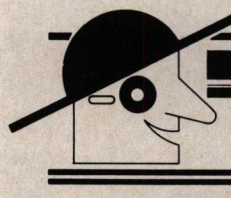

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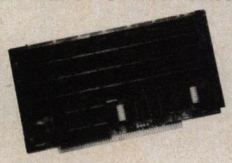

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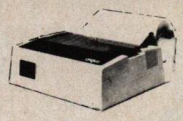

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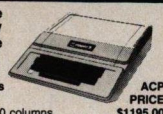

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HOW TO dBASE II

PART VII

In a tutorial series on dBase II, a popular program for database management

Welcome to our ongoing series of tutorials on the increasingly popular microcomputer-data-management tool dBASE II. If you have been following along through the last six installments in *A+*, you should now be fairly adept in many of the rudimentary as well as some of the more complex techniques for creating databases, storing information in them, and keeping that information up-to-date. We've also covered most of the approaches for data retrieval, including the use of the sorted and indexed databases, character-string searches, and the various types of "operators" that can greatly enhance your ability to extract from a database precisely the information you need.

This time, we will experiment with the application, creation, and modification of "memory variables." You will also get a chance to investigate the Count command.

Tutorial Conventions

These tutorials contain many examples. Sometimes I ask you to type in a command, and then dBASE II responds. Just to differentiate between what you do and what dBASE II responds with, the lowercase words are the ones you type. Uppercase will still work, so it doesn't really make a difference; it's just clearer this way. Some examples may specifically ask you to type in uppercase, but such cases always involve a series of words between quotation marks. The dBASE II responses are usually in uppercase letters. All screen interactions are listed in a different typeface to distinguish them from the text. To make these sections more readable, we imply carriage returns, rather than including them here.

In the command-syntax examples, words between square brackets (e.g., [before]) indicate an optional phrase or "argument."

Memory Variables

Ever use a pocket calculator that had a memory? Such a device allows you to store a number until you need to use it for a later calculation or reference. It's helpful when you want to use the same number over and over. Some calculators even have two or more registers (storage areas) for temporarily remembering numbers.

dBASE II has the same feature, but with it you can have as many as 64 memory spaces active at one time. Also, you're not limited to storing only numbers in them. You can also store words, letters, and logical (yes/no) information. So, what does this ability mean to the average dBASE II user? Two things: more flexibility when you use dBASE II to look at and modify databases and the option of running

programs that can perform complicated and/or repetitive tasks for you automatically. Without these memory spaces, called "memory variables," creating programs is next to impossible. Even though a discussion and series of tutorial articles on programming in *A+* is down the line a way, you will find knowledge of memory-variable usage to be valuable now. Why? Because you can create and use memory variables in the Keyboard Input Command mode, as well as under program control.

Incidentally, dBASE has two basic categories of variables, memory variables and field variables. You are already familiar with field variables—they are the blank spaces in your database records into which you type information. Memory variables and field variables are similar, except that your database stores only field variables. Through the use of dBASE commands, you can modify or even interchange field and memory variables, but you must take care not to assign an existing field name to a memory variable, or dBASE will confuse the two.

So, why the term *variable*? Any temporary storage area whose contents can be altered is called a *variable* (for obvious reasons) as opposed to a *constant*. The name Jimmy, which you might type into the First:Name field in a database is a variable because the name might be Harold in the next record. In contrast, the value of pi (3.14 . . .) is a constant, in that it never changes. You could, however, store 3.14 in a variable called "number" (for example). A variable is just a pigeonhole in which you can store data, including constants.

You can modify or even interchange field and memory variables, but you must take care not to assign an existing field name to a memory variable, or dBASE will confuse the two.

Before getting into the details, let's consider why you might want to use memory variables. Say you have a name-and-address file and you want one field in this file to contain a unique number for each person. You could type this number in manually for each person or use a memory variable and the Replace command to do this for you. You would store the beginning number of the series in a memory variable and replace the field variable in the first record with this number. Then you could tell dBASE to increment (add 1 to) the memory variable, skip+1 (move to the next record), write the new memory-variable number into that record, and so on. This procedure is just one of the many possibilities the use of memory variables creates. Now here are some of the details:

The rules of the game are as follows: dBASE allows 64 simultaneous memory variables, each with a maximum length of 254 characters. The total combined character count of all active variables may not exceed 1536. Variable names may be up to ten characters long and may include numbers and colons but no spaces (same format as field names).

As always, learning by experience is most efficient, so try these commands:

```
. store 3 to X
  3
. ? X
          3
. store ''Hello There'' to Y
Hello There
. ? Y
Hello There
. store 4 to z
  4
. store 456.034 to meml
 456.034
. ? meml
  456.034
. display memory
X           (N)    3
Y           (C) Hello There
Z           (N)   4
MEM1        (N)   456.034
** TOTAL **      04 VARIABLES USED  00033  BYTES
USED
```

Getting a little thick for you? Don't worry. Actually it's very simple. All you did was tell dBASE to store a number or word in a memory variable. The memory variable did not exist before you stored the information in it. dBASE created it for you and also gave it the name you chose. Store 3 to X literally means "put the number 3 into a slot that I want you to call X."

Unless you issue the Set Talk Off command before this process, dBASE will echo the value to the screen as it stores the value away. The ? commands, as you may recall, simply mean "what is the current value of . . . " The Display Memory command lists out all the current memory variables, their contents, and their types. These are the same abbreviations you use to characterize fields when you create a database (C,N, and L). As with fields in a database, we can also create logical variables:

```
. store T to X
.T.
. store F to Y
.F.
. store Y to Z
.T.
. store N to A
.F.
. display memory

X           (L)  .T.
Y           (L)  .F.
Z           (L)  .F.
A           (L)  .F.
** TOTAL **      04 VARIABLES USED  00008   BYTES
USED
```

Well, this doesn't make sense, does it? Why did storing Y to Z result in .T. being placed there? The answer is that, unless you enclose a letter in quotation marks, dBASE assumes you are trying to create a logical memory variable. Logical variables can have only two different states, Yes or No. For convenience, dBASE allows True/False to work too, with the same results. Therefore, Y is the same as T, and N the same as F. Any other letter causes confusion:

```
. store L to A
*** SYNTAX ERROR ***
     ?
store L to A
CORRECT AND RETRY (Y/N) ? Y
CHANGE FROM :L
CHANGE TO   :''L''
store ''L'' to A
MORE CORRECTIONS (Y/N)? N
 L
 . store ''A'' to B
 A
 . store A+B to D
 LA
 . store A+'.'+B+'.' to D
 L.A.
 . display memory

A          (C)  L
B          (C)  A
C          (C)  LA
D          (C)  L.A.
** TOTAL **    04 VARIABLES USED  00012   BYTES
USED
```

When you place the L in quotation marks, dBASE assumes you want to store letters or words in the memory variable, resulting in a "string" variable, a variable without special mathematical or logical value. String variables can include any printable characters, including numbers. Notice that you can combine two string variables to form a third one using the + sign. This process is called "concatenation." In the last example above, we concatenated some periods in order to create L.A. out of L and A.

Once you have some memory variables ferreted away, you can instruct dBASE to do things with them or even modify your databases with them or based on them.

You can use the plus sign, as well as the other arithmetic operators (−, *, and /) to manipulate numerical memory variables:

```
. set talk off
. store 3 to x
. store 5 to y
. store ((x+y)-(y-x))/3 * 8 to z
. ? z
.       19
```

Once you have some memory variables ferreted away, you can instruct dBASE to do things with them or even modify your databases with them or based on them. Suppose you forgot to include the state sales tax in the Cost field of the following file. You could rectify your oversight by using the following commands.

```
. use camplist
. display structure
STRUCTURE FOR FILE:  A:CAMPLIST.DBF
NUMBER OF RECORDS:   00007
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
FLD       NAME        TYPE   WIDTH     DEC
001       Item         C     010
002       Weight       N     002
003       Cost         N     005       002
004       Owner        C     010

. list
00001   BACKPACK        10       65.00   KARL
00002   CANTEEN          3       12.50   FRED
00003   FLASHLIGHT       5       15.00   CECI
00004   FOOD            30       45.27   GROUP
00005   RAINGEAR         7       12.95   VALERIE
00006   STOVE           25       85.00   KARL
00007   TENT            12       62.33   LISA B.

. store .065 to x
. goto top
. replace next 7 cost with cost+(cost*x)
00007 REPLACEMENT(S)

. list
00001   BACKPACK        10       69.22   KARL
00002   CANTEEN          3       13.31   FRED
00003   FLASHLIGHT       5       15.97   CECI
00004   FOOD            30       45.01   GROUP
00005   RAINGEAR         7       13.79   VALERIE
00006   STOVE           25       90.52   KARL
00007   TENT            12       66.38   LISA B.
```

Mixing Variable "Types"

An important caveat is that you cannot mix variables of different types. If you try to concatenate a character string to a number, you'll get a syntax error. Multiplying a number by a logical variable causes the same result:

```
. store 6 to y
. store ''mailing'' to program
. display memory

Y          (N)    6
PROGRAM    (C)    mailing


. store y+program to newvar
*** SYNTAX ERROR ***
     ?
store y+program to newvar
CORRECT AND RETRY (Y/N)? N
```

Macro Substitution

In most cases, you can refer to the contents of variables just by using the variable name. The arithmetic additions we performed above are typical examples.

Sometimes, however, you'll find it necessary, or at least convenient, to refer indirectly to a series of letters stored in a variable. Say you want to perform a complicated procedure repeatedly. You could type in the command from the keyboard each time, or you could use the & symbol for a "mac-

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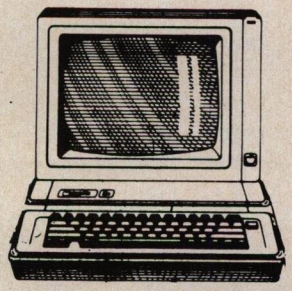

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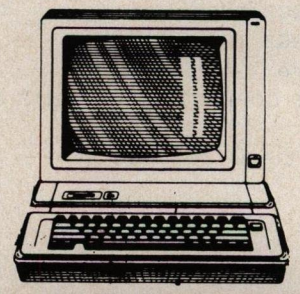

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ro substitution." When you place the & symbol immediately ahead of the name of a variable that contains a character string, dBASE replaces the & and the variable name with the contents of the variable:

```
. store ''display next 10 first:name'' to t
. &t
```

Typing in &t from the keyboard is much faster than typing the entire command, right? Macros often come in handy, but most of their uses apply to the writing of custom programs, so let's wait a few issues for more details. Remember, the contents of the variable must be a character string in this case. Thus, you must be certain to store the command in the variable with either double quotes (") or apostrophes (') on each end of the string. If you need to include either symbol within the string, then use the other one at each end. For example:

```
. store ''A Midsummer Night's Dream'' to
sleep
. store 'Please type in ''Yes'' or
''No'' ' to prompt
```

Clear, Restore, Release, and Save

As far as memory variables go, dBASE has some notable limitations. Since it allows only 64 variables at one time, you must sometimes be judicious in your planning—otherwise you may run out of room. dBASE is stingy with variable space because of its liberal use of memory for the program itself and for your data files.

One way of working around this problem is to use the Release command to clear out any variables that you don't currently need. Each time you release one variable, you regain the space that it used, for subsequent use by another variable. Try this example:

```
. store 2 to x
. store ''hello'' to y
. store 30 + 40 to z
. display memory

X          (N)    2
Y          (C)  hello
Z          (N)    70

. release x
. display memory

Y          (C)  hello
Z          (N)    70

. release y,z
. display memory

** TOTAL **    00 VARIABLES USED  00000   BYTES
USED
```

In revisions 2.4 and later, you can use the Release command with the All Like and All Except phrases, which let you use "wild card" descriptors (just like using the * and ? symbols with the DIR command in CP/M). Thus, you don't have to list all the variables you want to release:

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CIRCLE 263 ON READER SERVICE CARD

```
. display      memory
M1             (N)              10
M2             (N)              20
M3             (N)              30
M4             (N)              40
W1             (C)              Don't
W2             (C)              Worry
W3             (C)              Be
W4             (C)              Happy

. release all like m*
. display      memory
W1             (C)              Don't
W2             (C)              Worry
W3             (C)              Be
W4             (C)              Happy

. release all except ?4
. disp memo
W4             (C)              Happy
** TOTAL **    02 VARIABLES USED 000  13  BYTES
USED
```

Say you have laboriously created a list of variables that you would like to use on a regular basis or that a program uses for reference. You can avoid having to create them each time you enter dBASE; just use the Save and Restore commands. Typing:

```
. save to varlist
. restore from varlist
```

tells dBASE to save all the current memory variables in a file called VARLIST.MEM. Restore performs the reverse procedure—it clears out all existing variables in memory (as if you'd issued the Release All command) and then loads the variables that you stored in VARLIST.MEM back into your computer. As with the Release command, Save allows the use of the All Like and All Except phrases, in case you want to specify only a subset of your variables. Including the word *additive* tells dBASE not to release any currently active variables when it loads new ones from the disk file:

```
M1             (N)              10
M2             (N)              20
M3             (N)              30
M4             (N)              40
W1             (C)              Don't
W2             (C)              Worry
W3             (C)              Be
W4             (C)              Happy
** TOTAL **    08 VARIABLES USED  00049   BYTES
USED
. save to varlist
. release all
. store 365 to days
. restore from varlist additive
. display memory

DAYS           (N)              365
M1             (N)              10
M2             (N)              20
M3             (N)              30
M4             (N)              40
W1             (C)              Don't
W2             (C)              Worry
W3             (C)              Be
W4             (C)              Happy
```


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If the brute-force approach appeals to you, the quick-and-dirty technique for acquiring new memory-variable space employs the Clear command. Simply typing clear at the dBASE prompt will release all your memory variables—but beware. It will also close all open data files, so don't be alarmed if you type list or some other command and you get a NO DATABASE FILE IN USE, ENTER FILENAME: message.

Incidentally, another limitation in the area of variable handling is that dBASE does not support the use of memory-variable "arrays," as some other high-level languages, such as BASIC, do. Those of you who are already proficient programmers may find this restriction a nuisance. You can get around this problem, to some extent, by using the & symbol to create indirectly referenced quasi arrays. Here is an example:

```
. store 50 to n
. store ''L'' + str(n,2) to keeper
. store ''Hello'' to &keeper

. display memory
N               (N)              50
KEEPER          (C)             L50
L50             (C)             HELLO
```

By adding 1 to n and repeating these commands, we could create any number of variables, with names L51, L52, L53, and so on.

"How Many . . . ?"

dBASE users often find themselves wondering just how many records in their databases meet a certain requirement. Say you have a mailing list and are planning to print labels from it. You may need to know the number of mailing labels that you'll get for a specific ZIP code or range of ZIP codes, in order to calculate the number of canvas bulk-mailing sacks to pick up from the post office. Or, using a transaction account, perhaps you'd like to know the number of times a specific customer paid between $10 and $25 for an item. The combinations are almost limitless, but when you need to know "How many . . .?" the answer usually rests with the Count command.

Try this, using the Camplist database:

```
. use camplist
. list

STRUCTURE FOR FILE:   A:CAMPLIST.DBF
NUMBER OF RECORDS:    00007
DATE OF LAST UPDATE:  00/00/00
PRIMARY USE DATABASE
FLD        NAME       TYPE       WIDTH  DEC
001        Item        C           010
002        Weight      N           002
003        Cost        N           005  002
004        Owner       C           010
** TOTAL **                       00028

00001   BACKPACK        10       69.22   KARL
00002   CANTEEN          3       13.31   FRED
00003   FLASHLIGHT       5       15.97   CECI
00004*  FOOD            30       45.01   GROUP
00005*  RAINGEAR         7       13.79   VALERIE
00006   STOVE           25       90.52   KARL
00007   TENT            12       66.38   LISA B.
```

```
. count for weight <50 .and. weight >20
COUNT = 00002

. count for cost <13.00 .and. weight >30
COUNT = 00000

. count for *
COUNT = 00002
```

The "count for *" is a tricky way to determine how many of your records you have previously marked for deletion.

The typical syntax for figuring the number of people in a given ZIP-code area is:

```
. count for zip > 90000 .and. zip < 99999
COUNT = 00079
```

If your ZIP-code field is of the character (C) type, rather than numerical (N) in nature, replace zip with val(zip),

When you need to know "How many . . . ?" the answer usually rests with the Count command.

which converts the field into a numerical value before performing the comparisons.

You can store the result of the counting process in a memory variable for later reference or use it in a program:

```
. count for * to keeper
. ? keeper
    2
```

If all you want to know is how many records you've got, just type:

```
. count
  277
```

But it's faster to type goto bottom and ? # or display structure.

Here is a list of the possible variations of the Count command, using all of its possible arguments in a hypothetical example. The Next phrase results in limiting the search to only the next 20 records, beginning at the current position of the record pointer. The While phrase tells dBASE to check first to see whether the part number is above 100. If it is, the count continues—otherwise, it stops.

```
. count for part:no = 123
. count next 20 for part:no = 123
. count next 20 for part:no = 123 to x
. count next 20 for part:no = 123 to x
while part:no > 100
```

Well, until next time, continue to experiment, and if the area of memory variables seems a bit opaque to you, don't worry. Once we get into writing programs in dBASE II, what you have learned will pay off. And remember—keep those data files backed up. +

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NEWS+/BY FREDERIC E. DAVIS

Your inside source for developments and trends in the personal-computer industry

Welcome to News+, a new monthly report about the latest happenings, trends, predictions, and speculations in the world of microcomputing. Although the focus will naturally be on Apples, information about other important companies that affect Apples will also appear here in order to give you a wider perspective on the industry.

Since this is my first report, I'll take this opportunity to introduce myself. I've been using computers as a personal productivity tool for over 17 years. In fact, computers (and their associated corporate culture) have influenced my life from the very beginning—my father has worked for IBM since I was a baby.

While I was in high school, I dreamed of having a computer of my own, but it was a wild fantasy, since computers then cost millions of dollars and filled several large rooms with equipment. Ten years passed, and in 1977 the Apple II was introduced. Suddenly the idea of having my own computer was no longer so farfetched. After spending several months transfixed at a friend's Apple II, I decided to take the plunge. I consolidated the family resources and bought an Apple.

My wife, Robin, looked on with amazement (and eventually some horror) as I devoted more and more of my time, and the family budget, to the Apple. First the computer, then a disk drive, then a monitor, a printer, a modem, another disk drive, a CP/M card, an alpha Syntauri music synthesizer—you get the idea. Robin must finally have decided that it was either love it or leave it, and, much to my surprise, I caught her staying up late one night playing Falcons on the Apple. My wife was a graduate student, and when she realized how much the Apple could help her with word processing and research, we ended up vying for computer time. We've been a two-computer family ever since. Now that the Macintosh is here, I'm pushing the idea that in the case of computers, three might *not* be a crowd.

Before joining the *A+* team, I had a computer-consulting practice in San Francisco and was a free-lance science writer. I have B.A. and M.S. degrees from Antioch Unviersity, and I'm currently a Ph.D. candidate at Union Graduate school. Articles of mine have appeared in many publications, including *PC World*, *PCjr World*, *Whole Earth Software Review*, *Computer + Software News*, *Garden Magazine*, and *Orchid Review*. I've written several books, including *Hardware for the IBM PC and XT* published by PC World Books and Simon & Schuster, and *A Dictionary of Plant Names and Their Meanings* being published by Stanford University Press. As you may have gathered, I like plants as well as computers. Maybe that's why I've always thought "Apple" is such a great name for a computer.

Has some aspect of computing changed your life? Have microcomputers altered your way of doing business? I'd like to hear from you. If you have any news, suggestions, or comments, please send them to me here at *A+*.

THE BEST SOFTWARE MARKET

More than a million Apple II and compatible computers are now in use, and sales have been as high as 100,000 new systems per month. Even though sales of the IBM Personal Computer have recently been exceeding sales of the Apple II, Apple software continues to dominate the best-seller list. In fact, during one recent month, Apple Writer overtook the popular WordStar word-processing program in total sales volume—an amazing feat, considering that WordStar runs on over 800 different computers and Apple Writer runs only on Apples (and a handful of compatibles).

A big reason that the Apple software market is relatively lucrative for developers is that Apple owners buy more "disposable" software such as games and hobby diskettes, which are less expensive to develop and market than longer-lasting software. IBM PC users, on the other hand, tend to buy only a few "high-ticket" software packages such as WordStar and Lotus 1-2-3. Since the Apple has been around for over twice as long as the PC, Apple owners have upgraded their business software more often.

Another contributing factor in the software sweepstakes is that most Apples are purchased by upper-income individuals for a multitude of different purposes, and many IBM PC's are purchased by cash-conscious companies in multiple quantities for a specific function. The greater diversity among Apple owners means that the Apple software aftermarket will probably continue to remain healthier than the aftermarket for IBM PC software.

ARTISTS PRAISE MACINTOSH

Artists of all types, including traditional artists, commercial artists, computer-graphics specialists, and art hobbyists, are enthusiastic about the Macintosh. "The Mac is the most magical personal computer I've ever seen!" exclaims Dr. Adele Aldridge, chief executive officer of Magnetic Arts, a computer-graphics company in Sausalito, California. According to Aldridge, "elements of creative artistic design are found in the hardware, operating system, and application software. The Quickdraw graphics software built into each computer gives the Macintosh graphics capabilities far superior to those of any other personal computer. The MacPaint program is a wonderful example of how the Quickdraw graphics can be used in an application program. MacPaint is a wonderful tool—I'm sure it will help many artists become interested in personal computers."

HUGE GROWTH PREDICTED FOR IBM

A recent issue of Dun & Bradstreet's *Datamation* magazine makes bold predictions about IBM: (1) gross revenues of $35 billion last year (compared to slightly over $1 billion for Apple) will grow to $88 billion in four years; (2) in that same time, annual profits will grow from over $1 billion in 1983 to over $8 billion; (3) by 1988, IBM revenues will account for 2% of the gross national product (GNP). As a possible countermeasure to IBM's potential domination, AT&T is reportedly discussing a major deal with Apple that would include selling Apples at phone stores. A strong pact between AT&T and Apple could give IBM a real run for its money.

THE NEW APPLE NETWORK?

Datamation also reports that IBM has not one, but two, local-area networks (LANs) ready to market. Apple, along with the rest of the computer industry, has been anxiously awaiting an official announcement from IBM on this subject.

According to *Datamation*, one is a "token passing" network developed by IBM in Zürich, Switzerland, and in Research Triangle Park, North Carolina. It is compatible with IBM's Systems Network Architecture (SNA), which larger IBM computers use.

The other is a potentially more powerful, broader-bandwidth CSMA/CD network reportedly being developed by Sytek of Mountain View, California. IBM's CSMA/CD local-area network is the one likely to be adopted as an industry standard for microcomputers.

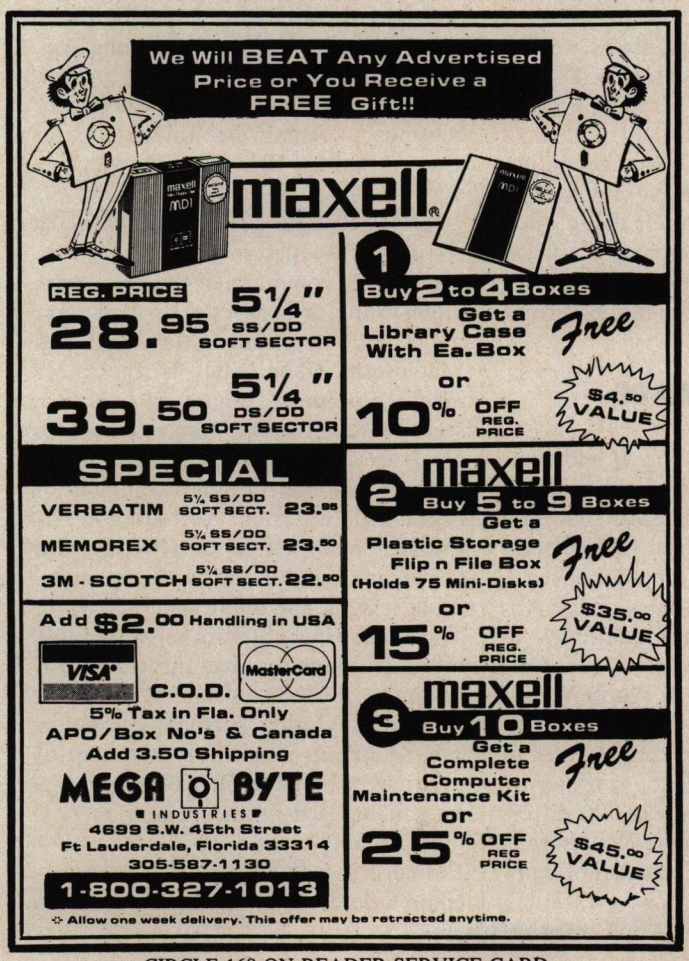
THE MOST POPULAR CP/M COMPUTER

Computers in the Apple II series, as Apple sells them, are incapable of running the popular CP/M operating system, since they do not contain the necessary Z80 CPU chip. Now, over a quarter of a million Z80 coprocessor boards have been sold for the Apple, making it the premier CP/M computer. Sales of Z80 coprocessors are continuing at a steady rate, as more owners of Apples and compatibles decide to add CP/M capabilities to their computers.

A MIGHTIER MACINTOSH?

The Macintosh is not as powerful as some people at Apple think it should be. Some members of the Macintosh design team hoped that the computer's disk capacity and internal RAM would be much larger. The Mac currently has a single-sided 3½-inch disk drive from Sony, which can store about 400K of data. Apple had originally intended to use double-sided drives with twice the storage capacity per diskette, but Sony was not able to supply the double-sided drives in time for Mac's introduction this past January. Apple still wants the double-sided drives and promises they will be available by the end of this year.

Apple is promising another important Macintosh feature by next year: more internal memory. The Mac currently contains a bank of 16 64K RAM chips, for a total of 128K bytes of available RAM. Apple had originally hoped to obtain 256K RAM chips instead of the 64K chips. If, instead of 64K RAM chips, you had 16 256K RAM chips, you would have 512K, four times the Mac's current internal memory. Although many forecasters have predicted that the price of RAM chips would take a prolonged nosedive, RAM costs have remained higher than expected, and 256K chips have been in extremely short supply. Apple still hopes, however, that prices will plummet as soon as availability increases.



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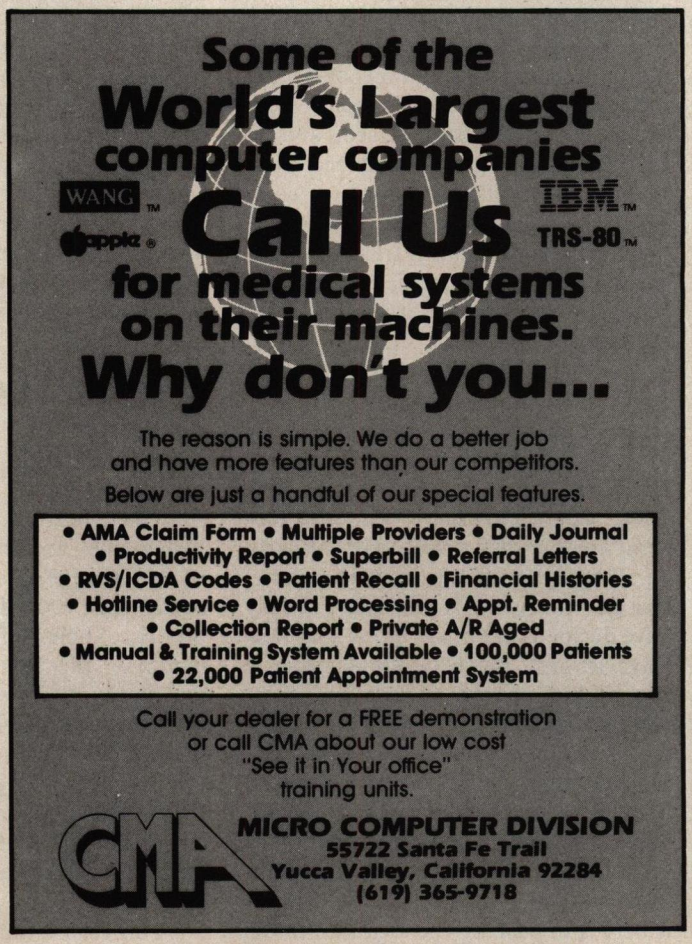

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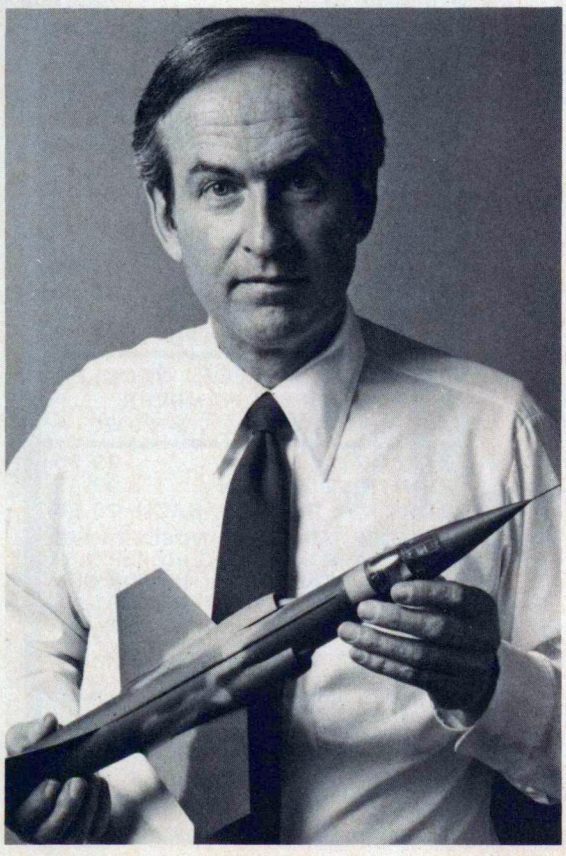

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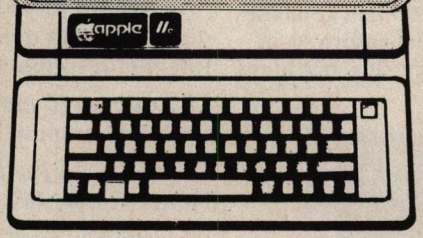

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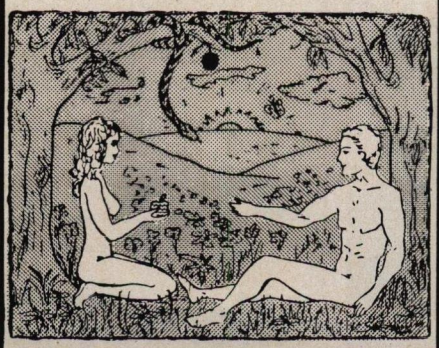

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When the chips are finally available, the Mac will be able to contain up to a half a megabyte of RAM without any changes in the design of the computer.

APPLE'S LISA-UPGRADE POLICY

Many purchasers of the Lisa 1 computer are not pleased with Apple's policy for upgrading their machines to Lisa 2's. Although Apple has offered to upgrade Lisa 1's to Lisa 2's at no cost, the deal is not as good as it first seems. The Lisa 1 has two built-in 5¼-inch floppy-disk drives capable of storing over 800K each. The "upgraded" Lisa 2 has only one 3½-inch drive capable of storing only 400K, which results in a net loss of more than a megabyte of on-line diskette storage. Another gripe is that it will cost $2495 to upgrade a Lisa 1 to a top-of-the-line Lisa 2/10, which costs only $5495 retail. A San Francisco Lisa 1 owner's complaint is typical: "I paid $10,000 for my Lisa 1 last year, and now Apple tells me I have to pay another $2495 to upgrade to a Lisa 2/10. That means I'll wind up paying $12,495 for a machine that costs $5495. Even if I get some kind of trade-in value for my ProFile hard disk, I'm still out over $5000."

Sales of the Lisa 1 were disappointing for Apple; some people think that the company should be more generous to the faithful few who paid the full $10,000 for their Lisa 1's.

INDUSTRY COMMITMENT TO APPLE II

Several new products for the Apple II family of computers help reinforce the idea that the Apple II will be around for quite a while. Apple has started shipping ProDOS, the long-awaited new operating system, and Appleworks, an integrated software package with word-processing, data-file, and spreadsheet functions.

Also, the Apple II family will finally have IBM PC compatibility, thanks to Rana Systems, of Chatsworth, California. The firm has announced a new multifunction peripheral that combines 256K RAM; two double-sided, double-density disk drives; and an 8086 processor that can run MS-DOS, MicroSoft Windows, and other popular operating systems. Lotus Development Corporation promises that its 1-2-3 integrated spreadsheet program will be available for the Rana system soon. Word has it that, as a result, the Apple will be able to run 1-2-3 considerably faster than the IBM PC can. +

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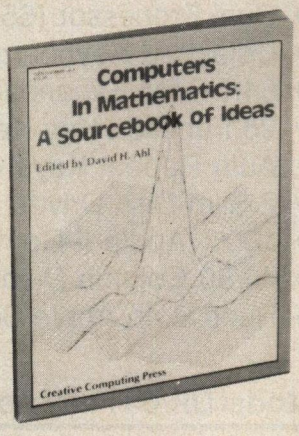

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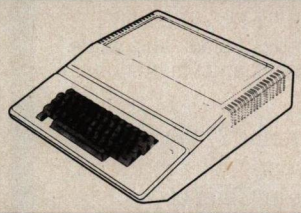

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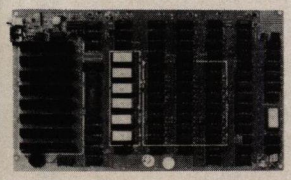

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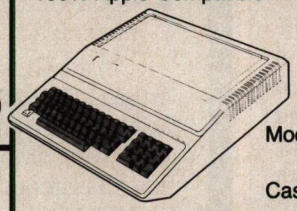

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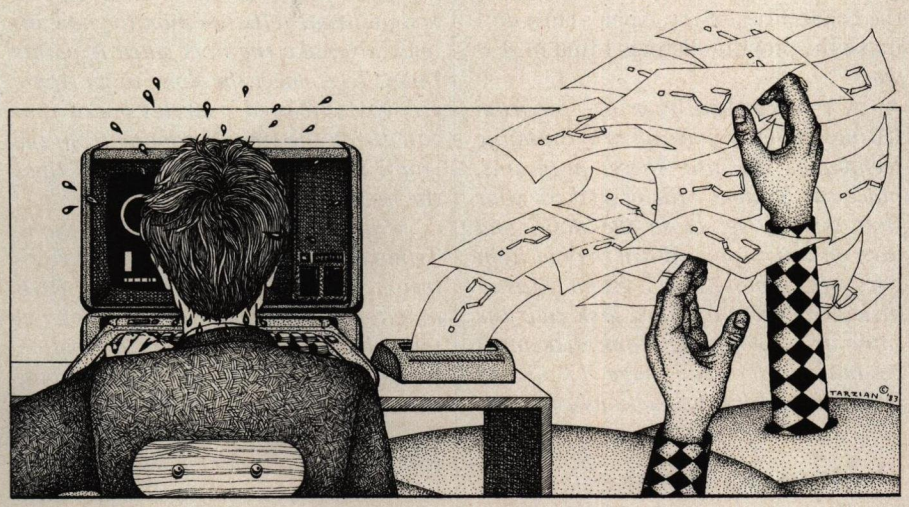
RESCUE SQUAD

BY LINDSAY McGRATH AND KEN BOOROM

Tips from Rescue Squad on the use of special printer commands, variable names, Control-S characters, 80-column text cards, program listings, color monitors, and Apple Pascal



Getting output to printer from Pascal

Q. How do I get output to my printer from Pascal?

A. *Declare a file called PRINTER and write your data to it. The following program will work in Apple II or Apple III Pascal.*

```
PROGRAM PRINT_IT.
VAR P : INTERACTIVE:
BEGIN
  REWRITE (P, 'PRINTER:'):
          { this line can be rewritten }
{ REWRITE  (P,  'CONSOLE:'):  }
        { to save paper during debug }
  WRITELN (P, 'This will go to the
  PRINTER');
  WRITELN ('This will go to the CON
  SOLE');
  CLOSE (P):
END.
```

Anything printed from a WRITE or a WRITELN in which 'P' is the first parameter will be sent to the file declared in the REWRITE statement (in this case PRINTER); everything else goes to the CONSOLE.

For more information refer to the following manuals.

Apple III Pascal
Programmers Manual, Vol. 1, Page 163
Apple II Pascal
Language Reference Manual, Page 27

Variable Names

Q. I'm an Apple II Plus owner and a beginning programmer. I'm just learning how to use variables. Do you have any tips on how to best incorporate them into my programs?

A. *Yes. Remember to keep your variable names short and different. Although you can create names with many letters, your computer only pays attention to the first two letters of any variable name in Applesoft. Two-variable names, such as FACT and FALL, may look different to you, but Applesoft and Integer BASIC recognizes both as having the name FA. This kind of confusion can really complicate your programming.*

Your computer only pays attention to the first two letters of any variable name in Applesoft.

Stray Control-S Characters

Q. Sometimes, when I use Control-S to look at a BASIC program listing on my Apple II Plus, a Syntax Error message appears on the next typed line. What is my computer trying to tell me?

A. *It sounds as though you inadvertently entered an extra Control-S after the program finished listing. The Apple put these extra characters into its input buffer, but then couldn't use them. No BASIC command begins with Control-S, so the Apple signaled that you had made a syntax error.*

If this happens again, press the left arrow key (←) until the screen displays a new prompt line. This will purge the input buffer of any stray Control-S characters.

Turning Off an 80-Column Text Card

Q. How can I turn off my computer's 80-column text card from a program? I use an Apple IIe.

A. *The Apple 80-column text card resides in the auxiliary I/O slot in the Apple IIe. This slot takes the place of slot 3 when you install an 80-column card. It works much the way the other I/O slots do, except in turning off the 80-column text card.*

You should not use the comand PR#0 to turn off the 80-column card because it won't completely disable the 80-column mode. To turn off the 80-column mode from within a program, use the following:

```
PRINT CHR$( 12):CHR$(21)
```

This method will send the text output back to a 40-column format with a normal, flashing cursor. To turn the card back on, use the PR#3 command. You should also use this technique whenever you send output to an external device, such as a printer or modem.

Underlining With Apple Writer

Q. When I want to underline in Apple Writer using the back-slash character, my printer prints U_N_D_E_R-L_I_N_E, instead of UNDERLINE. What am I doing wrong?

A. *The back-slash character works only with the Apple Daisy Wheel Printer, the Apple Dot Matrix Printer, and the Qume Spring 5/45 and 5/55. To underline on other printers, look in your particular printer's manual under printer commands.*

For example, the command to start underlining on the Apple Dot Matrix Printer is an Escape-X. The command to stop the underline is an Escape-Y.

To use them in Apple Writer, you would type in Control-V, Escape-X, Control-V, word you want to underline, Control-V, Escape-Y, Control-V.

Your Apple Writer manual can give you more information on using the Control-V function in Apple Writer.

Special-function codes for printers

Q: I have an Apple II Plus using DOS 3.3, Apple Writer II, a ProWriter printer, and a printer-interface card manufactured by Persoft. My problem is that I cannot figure out how to do special functions, such as underlining, from within Apple Writer II. The printer will perform underlining correctly when I run a program that uses the command for underlining as specified in the printer manual. How do I make Apple Writer II tell the printer to do special functions?

A: *Each brand of printer uses its own set of special codes to activate features such as underlining, boldface, italics, and different font sizes. The first step is to identify what set of codes your particular printer uses. As an example, I will refer to codes used by the Epson FX-80 printer.*

To invoke italics, for instance, you must send the printer the code Escape 4. To turn off italics, you use the code Escape 5. To implement these codes from within Apple Writer II, you first type Control-V, which allows you to enter Escape and Control codes directly from the keyboard. After pressing Control-V, you enter the code directly from the keyboard, in this case pressing the Escape key, which will result in an inverse bracket appearing on the screen. Since the Escape character is invisible, the inverse bracket lets you know that an escape has been entered. Follow the Escape with the number 4 (which turns on italics on the Epson). After you have entered the printer code, type Control-V again to return to the normal word-processing mode.

The process for entering Control codes is similar. If you wanted to enter a Control-O, for example, you would type Control-V (to enter the mode for entering Escape and Control codes), then Control-O (the printer code), and then Control-V again (to exit from the special mode). Using the Control-V feature allows you to enter any combination of Escape or Control codes into the document to govern printing functions. For further information, see page 48 of the Apple Writer IIe manual.

Entering programs

Q: I am a recent purchaser of an Apple IIe, having owned my computer for only seven months. I have been using the word processor, and it has been great. Now I want to learn more about the capabilities of the Apple. How do I make the program listings I find in *A+* work?

A: *A+ occasionally prints program listings as examples of programming technique. To use these programs, place the System Master disk in your first disk drive, close the door, and turn on your Apple. When the red light goes off, remove the System Master disk and insert a blank disk into the same drive (note: the blank disk must be initialized—read page 13 of the DOS manual for instructions on initializing disks). Before entering any program, type the word NEW and press the Return key. Enter the program exactly as it is printed in the magazine. Type RUN and press Return to run the program. Type LIST and press Return to show the line numbers and commands you typed in. Save your program by typing SAVE and the program name. Do not save two different programs with the same name. If you do, the latter one will erase the former. You can find more information on programming in BASIC in your Applesoft tutorial and DOS manual.*

How do I make the program listings I find in *A+* work?

Color-monitor hookup

Q: I have been trying to find out how to hook my Apple IIe up to a Sony KX-1901 video monitor's 25-pin RGB input. I would appreciate any help that you can provide concerning this interface problem.

A: *The Apple IIe's video generator produces signals radically different from those the Sony monitor expects. Briefly, an Apple IIe creates an image on its monitor by "painting" millions of dots on the screen with a paintbrush that starts in the upper left-hand corner and moves down each of 525 lines on the screen until it reaches the bottom right-hand corner. The brush continually changes color from red to green to blue, so the colors appearing on the screen depend entirely on when the brush is told to paint. A single line carries all the information needed to show these three colors in varying intensities.*

The Sony monitor is completely different. One of the 25 pins on the back of the monitor carries signals used to paint red dots on the screen, another carries signals for blue dots, another for green dots, and yet another carries a signal that tells the monitor how intense to make the dots when it paints them. To connect the Sony to an Apple IIe, you will need a circuit board that can divide the signals coming from the Apple IIe's single line into the 25 lines the monitor expects.

Many of the new color TVs (Sony Trinitron, for example) will give resolution approaching that of a RGB monitor when used with an Apple. A television is not the same as a monitor, however. To send an Apple's video output to a TV requires an inexpensive RF (radio frequency) modulator, available from any Apple dealer. If you buy a television, make sure it does not have digital tuning. You cannot adjust a digital tuner to receive the frequency an RF modulator produces.

More on Pascal

Q: Can you help me select the right Pascal system? I just recently purchased an Apple IIe with one Apple Disk II drive and one Rana disk drive. I'm a computer-science major, and I will soon be enrolling in a Pascal course.

A: *If you want an easily installed, trouble-free Pascal language system that is compatible with your Apple, buy the one Apple Computer produces—Apple Pascal. Leading modem and 80-column/lowercase-board manufacturers recognize Apple Pascal as the standard Pascal for the Apple II. If you purchase one of these accessories, you can be sure it will work with your Pascal. When you buy the Apple Pascal system, you will get a language card, which you should plug into slot 0 of your computer. Anything else plugged into that slot will have to go. In all probability, your Rana drive is compatible with Apple Pascal, but write Rana first to make sure.* ✚

Please send your questions and problems to Rescue Squad, A+, 11 Davis Drive, Belmont, CA 94002.

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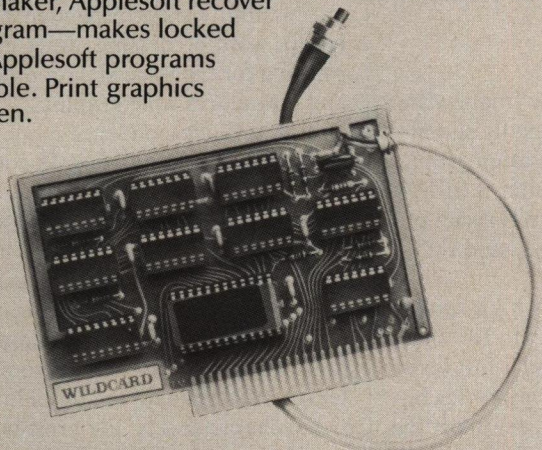
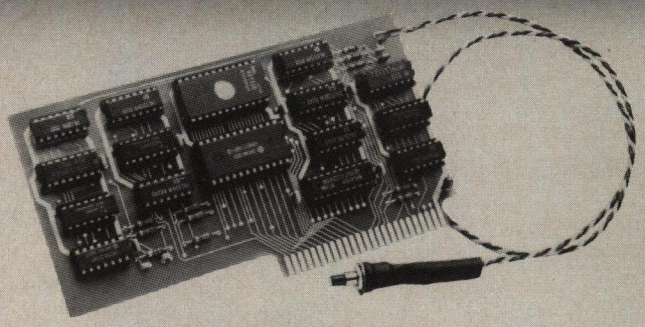


CIRCLE 169 ON READER SERVICE CARD



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System requirements: Wildcard: Apple II + w/64K, Apple IIe, Wildcard 2: Apple IIe, II + , II. All cards work with Franklin computers. An $8.00 mod kit is required for Franklin 1000, 1200.

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PRODUCT NEWS

Passport Design's Soundchaser MX-5 synthesizer

HARDWARE

Soundchaser MX-5
The Soundchaser MX-5 is a 16-digital-oscillator, two-channel, single-board synthesizer. The MX-5 sports a full-length, five-octave, professional music keyboard with improved cables, connectors, and synthesizers. A single circuit card contains the synthesizer, keyboard interface, clock sync, audio, and drum-machine connectors.

The Soundchaser MX-5 comes with Turbo-Traks—the 16-oscillator, 16-track recording software—and is available with Polywriter. All of the Soundchaser music software is available for the MX-5. (*List Price: $1495; with Polywriter, $1895*)
Requires: Apple II Plus or IIe; 48K RAM, 64K RAM with Polywriter; one disk drive with controller; game paddles or joystick; audio and video monitors
Passport Designs, Inc.
625 Miramontes Street, Suite 103
Half Moon Bay, CA 94019
(415) 726-0280

CIRCLE 550 ON READER SERVICE CARD

Imagewriter
The design of Apple's new Imagewriter dot-matrix printer is especially suited for reproducing high-resolution graphics at fast speeds. The printer is fully compatible with the Apple II series of computers, the III, the Lisa, and the Macintosh.

The Imagewriter prints high-resolution graphics at a rate of up to 180 characters per second (cps) and a full text up to 120 cps. The new printer uses bit-map graphics technology to support the graphics capabilities of the Lisa and the Macintosh. It uses a standard RS-232-C serial interface, so it will connect directly to the built-in serial ports of the Apple III or the Lisa. A special adapter cable is available for connecting Imagewriter to the Macintosh. Apple's Super Serial Interface Card connects it to the Apple II Plus or IIe.

The Imagewriter's case acts as an acoustical insulator, reducing the printer's operational noise to less than 53 dB(A), a sound level lower than background conversation.

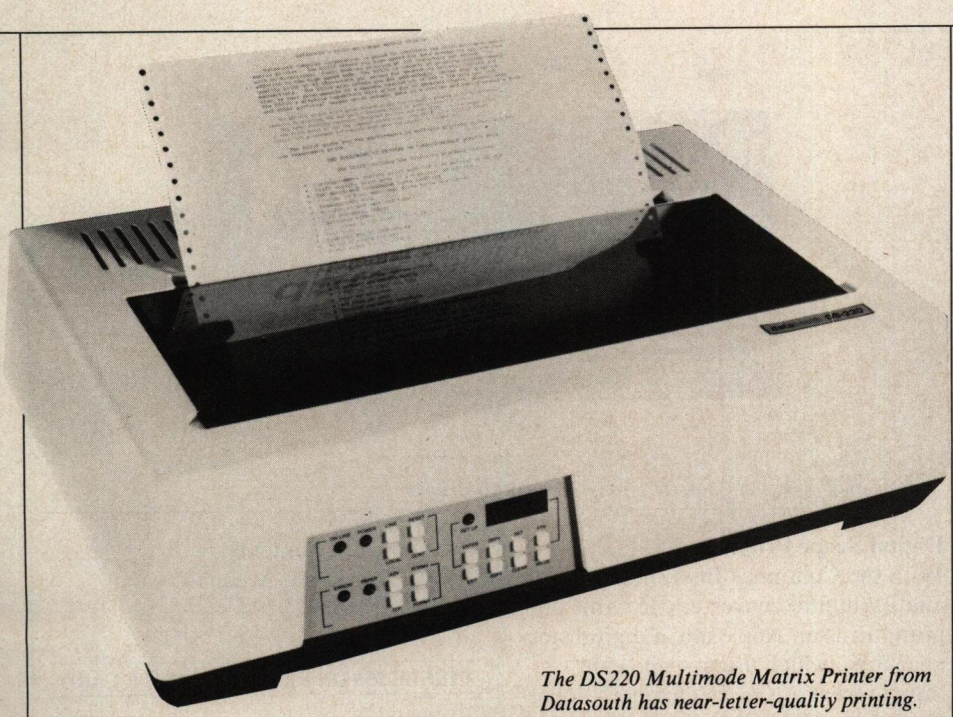
The printer features eight character fonts; users can design up to 175 additional characters and can mix various fonts in the same printed line. It provides variable resolution from 72 to 160 dots per inch and proportional font and spacing.

Imagewriter uses either friction-feed or adjustable-width pin-feed tractors and accommodates a range of paper widths from 3 to 10 inches. It uses single sheets of paper, fan-fold continuous forms, roll stock, and precut labels, and can print up to four copies at a time. (*List Price: $675*)
Requires: Apple II, II Plus, IIe, III, Lisa, or Macintosh
Apple Computer, Inc.
10260 Bandley Drive
Cupertino, CA 95014
(408) 996-1010

CIRCLE 551 ON READER SERVICE CARD

DS220 Multimode Matrix Printer
Designed to operate with high-performance micro- and mini-based business systems, the DS220 Multimode Matrix Printer combines three different printing capabilities: correspondence printing for word processing, draft-quality printing for high-speed data processing, and dot-addressable graphics.

In the Correspondence mode, the DS220 generates an 18 × 48 dot matrix for near-letter-quality appearance. Using a high-resolution two-pass-mode technique, the DS220 prints at 40 characters per second. Included as standard features are two correspondence-quality fonts, two memo fonts, variable-pitch draft fonts, and a special micro-character set. Also resident are seven international character sets. For print-intensive applications, the DS220 operates at 220 cps utilizing bidirectional logic-seeking printing. The high-resolution dot-addressable-graphics feature of the DS220 has the ability to print up to 217



The DS220 Multimode Matrix Printer from Datasouth has near-letter-quality printing.

columns for spreadsheets and then graphically output the results.

Compatible with virtually all microcomputers, the DS220 includes both serial and parallel interfaces as standard features along with a 2000-character buffer. (*List Price: $1995*)
Requires: Apple II, II Plus, IIe, or Lisa
Datasouth Computer Corporation
4216 Stuart Andrew Blvd.
Charlotte, NC 28210
(704) 523-8500

CIRCLE 552 ON READER SERVICE CARD

Quadram Boards
Multicore is a socketed multifunction board that contains a parallel port designed to operate most parallel printers and a serial port to connect modems, printers, and other devices. It also contains a chronograph. It comes with a software package called RAMcore Drive, which enables you to set up part of the system's total memory as multiple RAM drives and so increase the speed of your system operation. (*List Price: $395, 64K RAM version; $495, 128K RAM version*)

Redicore is an enhancement board that contains five functions: a complete printer parallel port; a serial communications port; a chronograph; RAMcore Drive; and a buffered memory. (*List Price: $249, no memory version; $299, 16K RAM version; $379, 64K RAM version*)

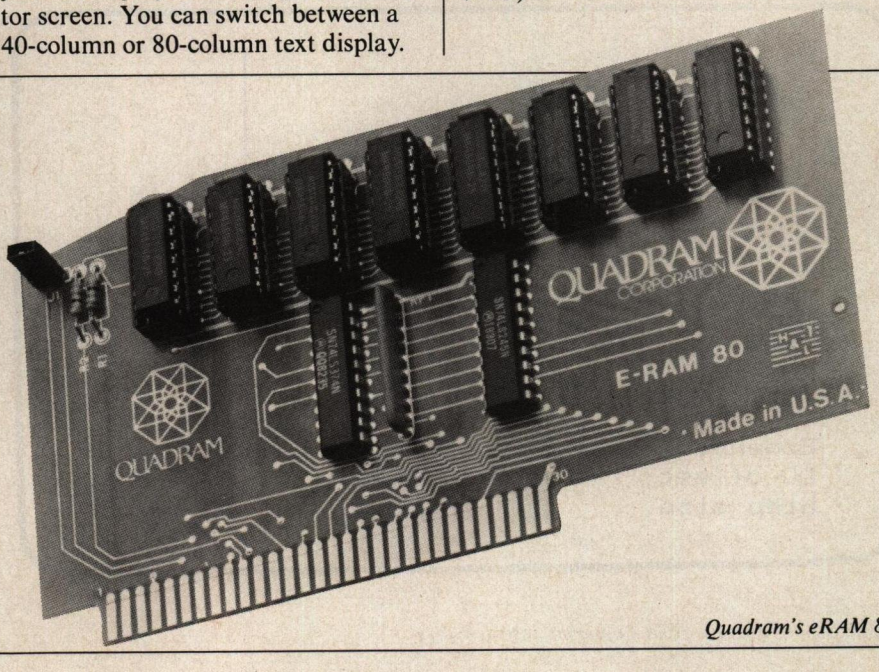
Transcore can become a parallel or serial printer interface. On-board software provides drivers for popular printers, and you can change the card configuration through menu-driven software. (*List Price: $199*)

eRAM 80 is an enhancement card designed to double the amount of text you can display on the Apple IIe monitor screen. You can switch between a 40-column or 80-column text display. eRAM 80 also provides you with 64K RAM (40-column format) or 63K RAM (80-column format) of memory, in addition to the 64K RAM installed on the Apple's main logic board. (*List Price: $159*)
Requires: Apple II, II Plus, or IIe; ProDOS or Apple DOS 3.3 (for Multicore, Redicore, and Transcore); Apple IIe only (eRAM 80).
Quadram Corporation
4355 International Blvd.
Norcross, GA 30093
(404) 923-6666

CIRCLE 553 ON READER SERVICE CARD

Apple Graphics Tablet
An electronic drawing board for creating computer graphics, the Apple Graphics Tablet enables users to develop and display block diagrams, architectural designs, logic diagrams, mechanical art, engineering schematics, and graphic art, in six different colors. The software utility that comes with the tablet allows users to save designs on a diskette and recall them later for review or revision.

The redesigned connecting cable meets FCC standards for radio-frequency interference. This new digitizing tablet is fully compatible with the variety of software packages available for the original product. (*List Price: $795*)



Quadram's eRAM 80

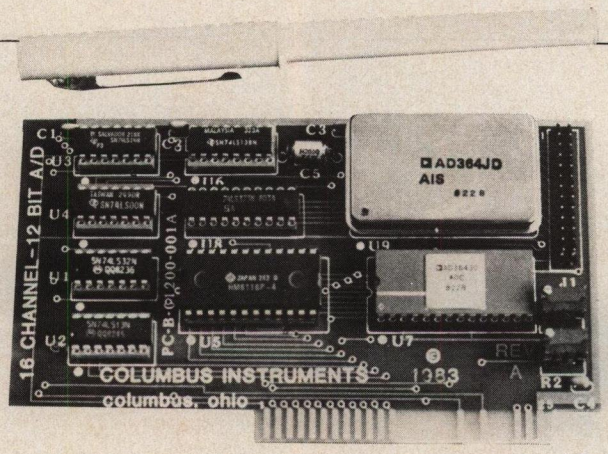
PRODUCT NEWS

Requires: Apple II, II Plus, or IIe; 48K RAM; one disk drive; color monitor recommended
Apple Computer, Inc.
10260 Bandley Drive
Cupertino, CA 95014
(408) 996-1010

CIRCLE 554 ON READER SERVICE CARD

New Analog/Digital Converter
This 12-bit A/D card provides 16 single-ended or 8 differential inputs that are software selectable. On-board software eliminates the headaches of writing machine-language subroutines. Simple BASIC statements are sufficient to address the A/D converter through the special subroutines contained in ROM. True 12-bit operation over +/− 5-volt input range yields resolution of 2.4 millivolts while maintaining a maximum system nonlinearity of less than 0.012%. Full 12-bit conversion time is 25 microseconds and a short-cycled 8-bit conversion only 15 microseconds. (*List Price: $599*)
Requires: Apple II Plus, IIe, or III in Emulation mode
Columbus Instruments
950 North Hague Avenue
Columbus, OH 43204
(614) 488-6176

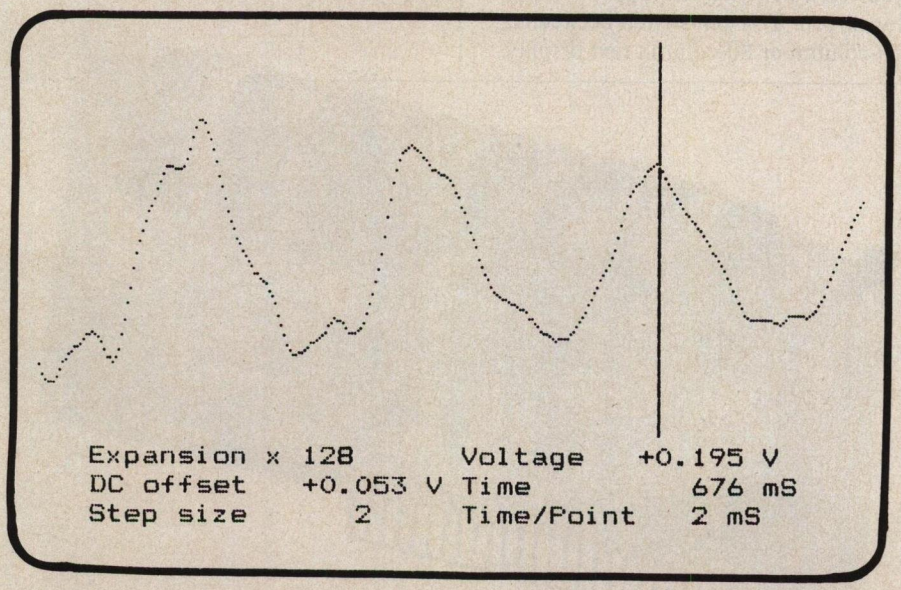
CIRCLE 555 ON READER SERVICE CARD



New Analog/Digital Converter, from Columbus Instruments

Digital Scope Program
With the Columbus Instruments 12-bit analog/digital converter card, this program turns an Apple into a digital storage scope, which users—who can sample from any of 16 channels—operate by single-key commands. Users can save the 4096 point buffer on diskette. The triggering section permits the selection of triggering level and slope for the start of the sample. Using the horizontal scrolling, D.C. offset, and vertical expansion, users can view any part of the sample. (*List Price: Free with purchase of 12-bit A/D converter card*)
Requires: Apple II Plus, IIe, or III in Emulation mode; 12-bit A/D converter card
Columbus Instruments
950 North Hague Avenue
Columbus, OH 43204
(614) 488-6176

CIRCLE 556 ON READER SERVICE CARD



Digital Scope Program, from Columbus Instruments

The Bank
The Bank is a random-access storage device for data applications that consist of large amounts of information. The Bank plugs into your Omninet local area network.

It accesses data randomly and can find any item of information on a 200-megabyte cartridge in an average of ten seconds. The cartridges come in two sizes, 100-megabyte or 200-megabyte—the latter capable of holding 66,572 typed pages of information. (*List Price: $2195; $70, 100-megabyte cartridge; $100, 200-megabyte cartridge*)
Corvus Systems, Inc.
2029 O'Toole Avenue
San Jose, CA 95131
(408) 946-7700

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The Key—Serial Version
A serial version of The Key, a hardware module that protects software products from being pirated, is now available.

Interactions of software and The Key form inquiry/response pairs. The use of many inquiry/response pairs enhances the security and allows more than one software package to be utilized with the same Key. By requiring

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CIRCLE 131 ON READER SERVICE CARD

the use of The Key, software suppliers can control the use of their software. *(List Price: $300)*
Requires: Apple II, II Plus, or IIe with Super Serial card
STAFF Computer Technology Corporation
10457 J Roselle Street
San Diego, CA 92121
(619) 453-0303

CIRCLE 558 ON READER SERVICE CARD

HARDWARE/SOFTWARE

Talking Transend II

Talking Transend II incorporates Transend 2—the electronic communications package for the Apple II and IIe—a Transend modem, and an Echo II synthesizer board.

To use Talking Transend II, users simply put the disk in the drive and turn the system on.

The speech synthesizer speaks all information that the program writes to the video-display screen. When users type in information from the keyboard, each keystroke is spoken back to them. *(List Price: $195)*
Requires: Apple II, II Plus, or IIe; 64K RAM; one disk drive; Echo II Speech Synthesizer; modem
Computer Aids Corporation
4929 S. Lafayette Street
Fort Wayne, IN 46806
(219) 456-2148

CIRCLE 559 ON READER SERVICE CARD

MegaTask Plus

MegaTask Plus is a combined, multiproduct hardware and software package that provides an instant virtual-memory expansion, an Applesoft-compatible SuperBASIC, and a series of business-management packages that enhance the power and value of the Apple II in both systems programming and business applications. MegaTask and MegaDOS employ multitasking system processing techniques (as many as 16 programs or tasks can execute at one time); 8 megabytes of virtual memory; and 100 to 400 new mainframe BASIC commands. Applications include business graphics, editing systems and format-related commands, communications/corporate database-management systems, and report-generator and business-analysis programs. (*List Price: $495*)
Requires: Apple II Plus or IIe; Applesoft; DOS 3.3
Quantum Leap Technologies
P.O. Box 7713
Silver Spring, MD 20910
(301) 565-4656

CIRCLE 560 ON READER SERVICE CARD

HARDWARE ACCESSORIES

Clean Runner

Clean Runner, an interactive disk-drive program/cleaner, leads computer users step-by-step through the cleaning process. Clean Runner uses a lint-free cleaning surface bonded to a polyester diskette. Its exclusive program directs the head(s) of a computer's drive to a different track for each cleaning, providing a contamination-free cleaning surface.

Each cleaning operation takes less than 30 seconds, works on both single-sided or double-sided drives, and is programmed for 20 cleaning operations. (*List Price: $24.95*)
Discwasher
1407 North Providence Road
P.O. Box 6021
Columbia, MO 65205
(314) 449-0941

CIRCLE 561 ON READER SERVICE CARD

Spikemaster

Spikemaster safeguards valuable computer hardware and software from damaging surges in electrical current. Spikemaster also protects audio and video systems from potential damage due to power surges. Spikemaster features include:

- multimode protection—common mode and differential mode incorporating five active-surge-suppression devices with a five-part filter section
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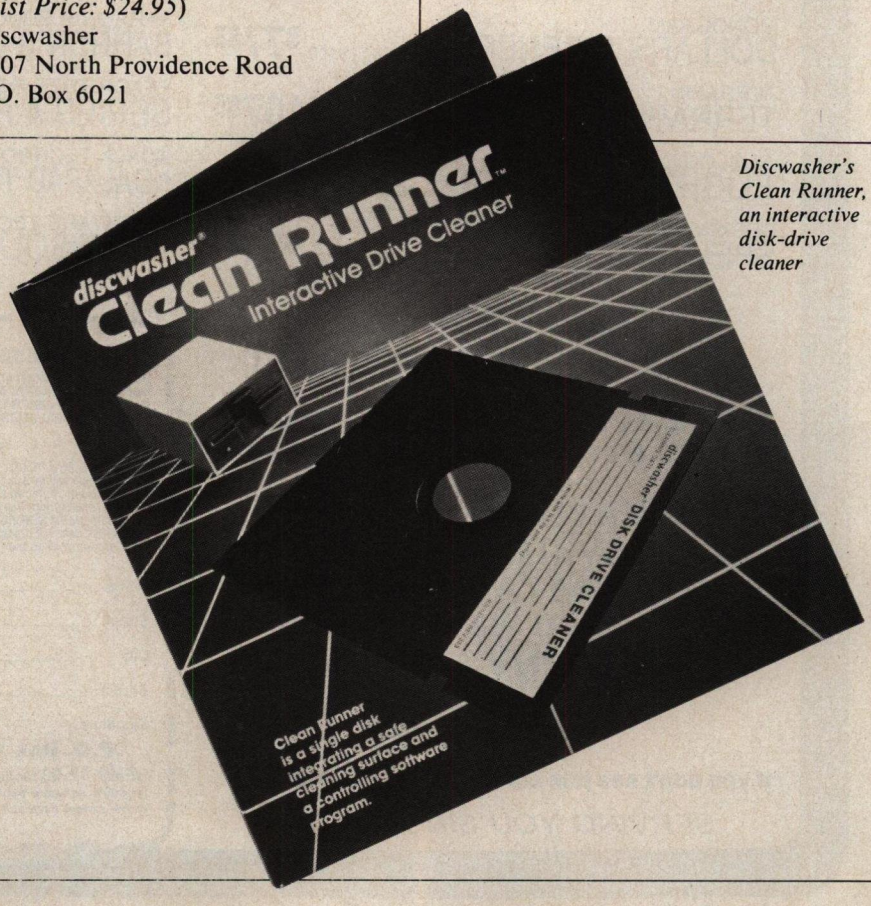
- four widely spaced sockets with a 6½-foot heavy-duty cord
- circuit breaker
- on/off switch with indicator light
- 15-amp capability.

(*List Price: $79.95*)
Discwasher
1407 North Providence Road
P.O. Box 6021



Discwasher's Clean Runner, an interactive disk-drive cleaner

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CIRCLE 157 ON READER SERVICE CARD

Columbia, MO 65205
(314) 449-0941

CIRCLE 562 ON READER SERVICE CARD

SOFTWARE

Paper Graphics

Paper Graphics is a utility for printing high-resolution graphics screens to any printer/interface card combination.

This program lets users print out any portion of a screen in nine magnifications, frame or crop pictures, and even add text and labels. It rotates, flips, mirrors, or inverts graphic screens and varies print intensities for lighter or darker prints.

The program can print several pictures sequentially and automatically and can print both graphics screens for a panorama effect.

Paper Graphics can also pack or unpack pictures. It works with Dow Jones Market Analyzer and other programs that use high-resolution graphics screens. (*List Price: $49.95*)

Requires: Apple II, II Plus, or IIe; 48K RAM; one disk drive; printer

Penguin Software
830 4th Avenue
Geneva, IL 60134
(312) 232-1984

CIRCLE 563 ON READER SERVICE CARD

Bookkeeping System

Bookkeeping is a comprehensive starter package that assists small businesses (up to 50 employees) to computerize their accounting programs. The system includes all the necessary functions to enter and track accounting transactions and to provide financial reports for analysis and auditing.

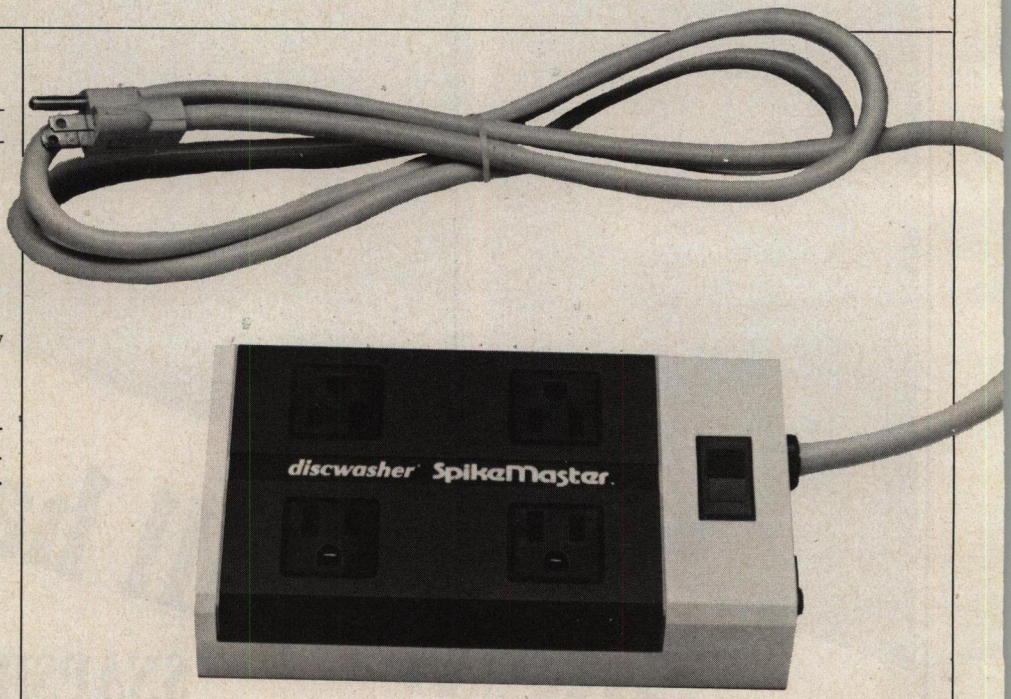
The system's major functions are Account Maintenance, General Ledger Reports, General Ledger Graphics, Financial Statements, Vendor Maintenance, Check Printing, Housekeeping, and Daily Transactions (General Journal, Cash Disbursements, Daily Sales Journal, and Cash Receipts).

Particularly suitable for small businesses that are oriented toward cash-basis accounting—such as dry cleaners, beauty shops, florists, and bowling alleys—Bookkeeping assumes little or no user experience with computers, and its programs and user manual provide helpful prompts and instructions. (*List Price: $495*)

Requires: Apple II, II Plus, IIe, or III; 64K RAM; two disk drives; 80-column card

State of the Art, Inc.
3183-A Airway Avenue
Costa Mesa, CA 92646-4618
(714) 850-0111

CIRCLE 564 ON READER SERVICE CARD



Discwasher's new Spikemaster safeguards computer hardware and software from electrical surges.

MediCard

Lisa MediCard is a medical-billing application designed to operate on the Lisa. MediCard is also available for the Apple II and III. Designed to manage the billing and claim-form preparation for small medical offices, the new application is well suited to such specialties as psychiatry, psychology, and anesthesiology.

The system allows the rapid development of data for billing small patient bases.

The system features a complete monthly billing system and an instant preparation of standard AMA universal claim forms. Patient records can be examined immediately for up-to-the-moment balances. Users can operate MediCard as they would any other Lisa application, using the mouse, pull-down windows, and screen icons. MediCard operates as a "stationery pad" for complete medical billing. (*List Price: $349.95*)

Requires: Apple II, III, or Lisa; VisiCalc; one disk drive; 80-column printer

CMA Micro Computer
Lisa Project Taskforce
55722 Santa Fe Trail
Yucca Valley, CA 92284
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CIRCLE 565 ON READER SERVICE CARD

The Krell Turtle Pak

The Turtle Pak for schools (authorized by MIT) is available in 20-pak and 40-pak sizes, containing 20 and 40 disks respectively. Each Turtle Pak also contains Alice in Logoland disks and primer and utility disks with MIT's programs, Dynatrack, Shape Editor, Music Editor, and Sprite Drivers. In addition, each Turtle Pak contains Krell Logo commands wall charts, *Learning with Logo* by Daniel Watt, and the official MIT technical manual, *Logo for Apple II*. (*List Price: $499.95, the 20*

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ext. 467

CIRCLE 237 ON READER SERVICE CARD

pak; $899.95, the 40 pak)
Requires: Apple II, II Plus, or IIe; 64K RAM; one disk drive
Krell Software Corp.
1320 Stony Brook Road
Stony Brook, New York 11790
(516) 751-5139

CIRCLE 566 ON READER SERVICE CARD

Terrapin Logo Version 2.0
Terrapin, Inc. has announced Version 2.0 of its Logo language for the Apple II, II Plus and IIe. Significant enhancements over the current Version 1.3 include the addition of six new primitives and several editor commands; improved garbage-collection capabilities; full-function support for all four cursor keys on the IIe; and ability to read program files created under Apple Logo.

Terrapin also has released an extensive Words and Lists chapter in its Logo manual. Topics in the new documentation subset include recursion, interactive graphics, quizzes, word games, and artificial-intelligence programming. In addition, the 142-page document includes over 40 programming projects and solutions. (*List Price: $149.95, complete Logo package with language disk, full documentation, and utilities disk; $12.50, Words and Lists chapter; $20, Version 1.3 update; $5, Words and Lists chapter*)
Requires: Apple II, II Plus, or IIe
Terrapin, Inc.
380 Green Street
Cambridge, MA 02139
(617) 492-8816

CIRCLE 567 ON READER SERVICE CARD

CustomFONT
CustomFONT, a new utility for use with Apple III word-processing, spreadsheets, and user programs, enhances them with custom characters, symbols, and fonts. Possible applications include special symbols, business logos, complex mathematical formulas, foreign-language characters, and block graphics.

CustomFONT includes built-in file utilities and a file of ready-to-use symbols for technical writing, screen and report formatting, and games. Character design and font-file customization is accomplished via an interactive graphic interface. ASCII tables and keyboard guides can be printed as an aid to using customized character sets. Special features for developers include commands to create flashing characters and listings of routines to download character sets at run time. CustomFONT is easy to transfer to the ProFile or any other hard disk. On-line help screens and complete documentation ensure ease of use in any application. (*List Price: $149*)
Requires: Apple III; 256K RAM; hard-disk drive; printer
Swenson Associates, Inc.
45 Newbury Street
Boston, MA 02116
(617) 267-3632

CIRCLE 569 ON READER SERVICE CARD

Educational Software
American Educational Computer, Inc., has introduced home-computer software that follows standard classroom format. The programs have been developed in two series: Easy Reader covers phonics and reading comprehension; and Matchmaker covers vocabulary skills, grammar, U.S. geography, world geography, and Spanish I. Each of the 11 software packages initially offered is bracketed to match appropriate grade and learning levels.

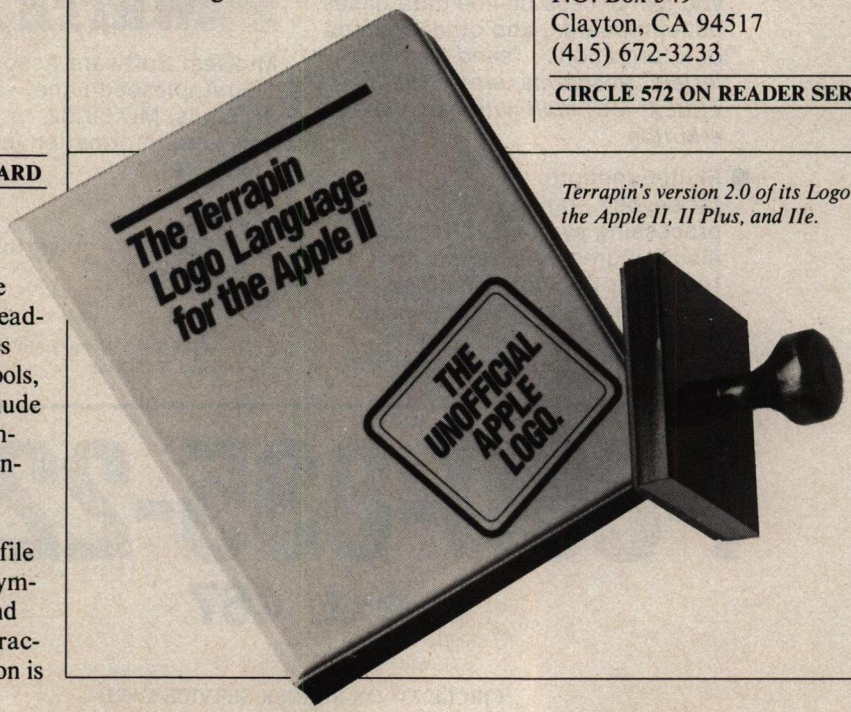
The Matchmaker series contains additional programming space to create tailored drills. When students have mastered 70% of two lessons, they can play a video game before moving on to the next lesson. (*List Price: $39.95 each*)
Requires: Apple II, II Plus, or IIe; 48K RAM; one disk drive
American Educational Computer, Inc.
2450 Embarcadero Way
Palo Alto, CA 94303
(415) 494-2021

CIRCLE 570 ON READER SERVICE CARD

Stock Tracker
This program uses the Dow Jones News/Retrieval service to acquire either daily or historical quotation data. The program then prepares and automatically feeds the data to the Stock Tracker program. The program requires very little operator time. Compiled format permits rapid operation.

Stock Tracker offers technical volume analysis of stock trends, with programmed buy-sell-hold trading signals complemented by graphics and extensive numeric-volume analysis. (*List Price: $195*)
Requires: Apple II or IIe; auto-dial modem capable of 300-baud transmission
H&H Trading Company
P.O. Box 549
Clayton, CA 94517
(415) 672-3233

CIRCLE 572 ON READER SERVICE CARD



Terrapin's version 2.0 of its Logo language for the Apple II, II Plus, and IIe.

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HARDWARE

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Apple Dot Matrix	553.00
Apple Daisy Wheel	1,826.00
BROTHER HR 25	775.00
DIABLO	
620	850.00
630	1,625.00
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DX-15	450.00
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FX-80	550.00
FX-100	685.00
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1550AP (ProWriter II)	655.00
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TAXAN	
12" AMBER	135.00
210 Color	299.00
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RGB-II Interface	140.00

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Zardax	150.00
APPLE	
Apple Writer IIe	160.00
Quick File IIe	80.00
ARTSCI	
Magic Calc	95.00
Magic Memory	71.00
Magic Window II	95.00
ARTWORKS Magic List 3.0	23.00
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The Tax Advantage	45.00
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EDUCATIONAL

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CBS Software	Call
COUNTERPOINT SOFTWARE	
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Sticky Bear ABC	27.00
Sticky Bear Bop	27.00
Sticky Bear Opposites	27.00
Sticky Bear Shapes	27.00
Sticky Bear Basket Bnc.	27.00

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Program	Our Price
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Alpha Plot	27.00
Apple Mechanic	20.00
Beagle Basic	24.00
Disk Quick	22.00
Doss Boss	16.00
Double Take	24.00
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Program	Our Price
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Videoterm	245.00
ZOOM TELEFONICS	
Networker	105.00
Netmaster	65.00
Combo	145.00

MEDIA

Program	Our Price
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MAXELL 5 ¼ SSDD	28.00
VERBATIM 5 ¼ SSDD	27.80

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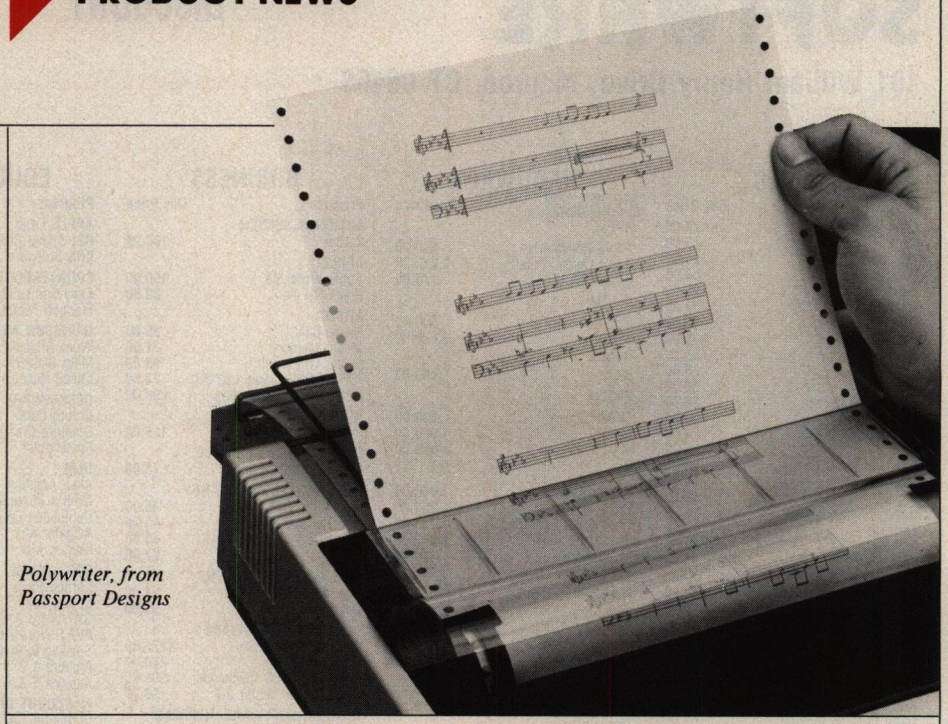
CIRCLE 330 ON READER SERVICE CARD

PRODUCT NEWS



Polywriter, from Passport Designs

Polywriter
Polywriter, a music-writing program from Passport Designs, Inc., provides printouts from the Soundchaser keyboard in the following score formats: single treble line, single bass line, piano score, choral score, treble clef with piano, base clef with piano, and full orchestral score.

Polywriter prints in standard music notation and accurately handles note division, seconds, accidentals, ties, 8vas, flags and beams, split stemming, triplet brackets, rests, any time signature (up to 15 including complex and asymmetrical), any key signature, transposition up or down nine half steps, and logical allocation of space. Polywriter has a full-scale editor that allows for all standard features as well as lyrics and chord symbols. (*List Price: $595*)
Requires: Apple II, II Plus, or IIe; 64K RAM; Soundchaser Basic System; one disk drive; monitor; interface card; dot-matrix printer with graphics
Passport Designs, Inc.
625 Miramontes Street, Suite 103
Half Moon Bay, CA 94019
(415) 726-0280

CIRCLE 571 ON READER SERVICE CARD

Competitive Edge
Developed to assist real-estate agents, brokers, bankers, accountants, developers, and private investors, the Competitive Edge can analyze complex purchase offers and determine the best terms from the seller's point of view. The program asks a series of questions to prompt users to enter the appropriate data. It provides a short narrative summary of each evaluation. *(List Price: $500; $10, demonstration kit)*
Requires: Apple II Plus, IIe, or III: 64K RAM; CP/M; 5¼- or 8-inch disk drive.
Softronics, Inc.
100 South King Street, Suite 270
Seattle, WA 98104
(206) 587-0688

CIRCLE 573 ON READER SERVICE CARD

Tax Advantage
Tax Advantage, Continental Software's latest tax-preparation-aid package, interfaces with the company's household-finance package, Home Accountant. Users can transfer data directly from their Home Accountant database to Tax Advantage without manually reentering the information. The interface portion of Tax Advantage will take totals from tax-significant Home Accountant budget categories and automatically enter these totals in the appropriate spots on the Tax Advantage 1040 form, and on related schedules.

Tax Advantage supports form 1040, schedules A, B, C, D, E, G, W, and SE, and form 4562. All program functions are menu-controlled and users can enter them with a few easily learned keystrokes. (*List Price: $69.95*)
Requires: Apple II Plus or IIe; 48K RAM; one disk drive
Continental Software
11223 South Hindry Avenue
Los Angeles, CA 90045
(213) 417-8031

CIRCLE 574 ON READER SERVICE CARD

Software Fitness Program
Software Fitness Program consists of seven interactive accounting applications and a complementary report writer and data formatter. The programs run in Science Management Corporation's (SMC) Business BASIC under Microsoft's multiuser XENIX operating system.

The accounting series, known as the Software Fitness Program, includes modules for accounts receivable with billing and sales-analysis functions, accounts payable, general ledger, inventory, payroll, sales-order processing, and a fully integrated job-cost system.

The report writer, called The Team Manager, creates custom reports using data from the accounting applications. It can format data to be compatible with many popular word-processing, spreadsheet, and database-management systems.

These products, the first Lisa applications to run under XENIX, add the multiuser dimension provided by that operating system to the Lisa's capabilities.

One Lisa system can act as a "host" for Apple II, III, or other Lisa personal computers, or for several types of terminals. This allows users in different locations to use the software and information base resident in the host Lisa system. *(List Price: $695)*
Requires: Apple III or Lisa; Microsoft CP/M SoftCard; ProFile hard disk; 64K RAM; 80-column printer
Open Systems, Inc.
430 Oak Grove
Minneapolis, MN 55403
(612) 870-3515

CIRCLE 575 ON READER SERVICE CARD

Netmaster
Netmaster, a high-speed communications program for the Apple II family of computers, operates with 300 baud modems and "talks" to other communications software.

SCRG

SWITCH-A-SLOT

The **SWITCH-A-SLOT** is an expansion chassis, which allows the user to plug in up to four peripheral cards at one time. One of these cards is selected for use, and only that card draws power.

This product is especially useful where the software requires the printer to be in a particular slot, and the user wishes to choose between two or more printers.

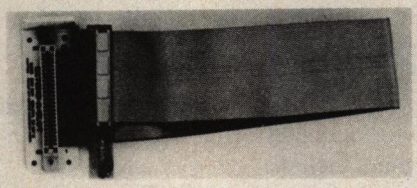
- Allows up to four peripheral cards to be plugged into one peripheral slot.
- User selects desired card by front panel rotary switch.
- Only selected card draws power.
- Plugs into any peripheral slot.
- Saves wear and tear on delicate connectors.
- 18" cable connects Switch-a-slot to computer.

New—resistive terminations for better response

$179.50 36" Cable $189.50

SWITCH-A-SLOT and EXTEND-A-SLOT work well with all slow to medium speed cards, such as Modems, Printers, Clock, 80 Column, Music, etc. They are not recommended for high speed data transfer devices such as disk drive controllers, alternate processor, and memory cards. These products may be incompatible with some alternate processor cards.

EXTEND-A-SLOT



The **EXTEND-A-SLOT** brings a slot outside your APPLE™, allowing an easy change of cards. The 18" flex cable is long enough to allow placement of the card in a convenient location. The high quality connectors are gold plated for reliability.

The perfect accessory for:

Owners of large numbers of I/O expansion cards—keep your frequently used cards installed. Use the EXTEND-A-SLOT for the others.

Technicians—easy access to test points on accessory cards under actual operating conditions.

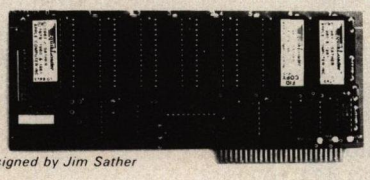
Experimenters—make easy changes to cards while card is installed.

EASY TO USE—just plug it in as you would any expansion card, then plug your card in. When you want to change cards, do it easily outside the computer, without the wear and tear on the computer expansion slot.

$34.95

NEW PRODUCT

quikLoader



Designed by Jim Sather

SPEED

The quikLoader is the *fastest* way to load programs, ***BAR NONE!*** Applesoft, Integer, or machine language programs can be loaded in fractions of a second. More importantly, DOS is instantly loaded every time the computer is turned on. Integer is even loaded in the language card. This process takes less than a second, saving valuable time. The quikLoader operating system can keep track of over 250 programs stored in **PROM**s (Programmable Read Only Memory). The user simply transfers any of these programs to PROM using the instructions packed with the unit, and any PROM programmer, or we will provide this service.

CONVENIENCE

How many times have you started to work with a frequently used program, only to find that you have misplaced the disk, or worse, had the disk damaged, or the dreaded "I/O ERROR" message flash on the screen. With the quikLoader, these nightmares can be a thing of the past. Frequently used programs are available *instantly* when you need them, without having to look for the disk, or hoping that the lengthy disk loading procedure goes smoothly. If you do need to use standard disks, the quikLoader even speeds up that process. For example, to catalog a disk, just press ctrl-C Reset. To run the "HELLO" program, press crtl-H Reset Other "one-key" commands include entering the monitor, booting the disk, calling up the mini-assembler, etc. The major difference between the quikLoader and the other ROM cards is the complete operating system (in PROM). This enables you to get the quikLoader catalog on the screen (by pressing ctrl-Q Reset), allowing you to see what programs are available. Loading or running of the desired program requires one keypress. Program parameters, such as starting address and length of machine language programs can be seen on the catalog screen, if desired.

VERSATILE

The quikLoader will accept any of the popular PROMS available on the market, 2716, 2732, 2764, 27128 and 27256. These types may be freely intermixed on the card. Long programs can take up more than one PROM, or several short programs may be stored on one PROM. The quikLoader operating system even handles multiple cards, so you can easily double or triple the amount of PROM memory available. The ultimate memory capacity of one card is 256K, so many frequently used programs and utilities can be stored. We even start your library of programs with the most popular utilities on the card, FID and COPYA. Now, if you have to copy a disk, you don't have to search for the master disk. You can start copying within 3 seconds after turning on the computer.

INCREASED DISK CAPACITY

Since DOS is loaded from the quikLoader every time the computer is turned on, it is not necessary to take up valuable disk space with DOS. This will give you more than 10% additional space for programs and data on your disks.

SYSTEM REQUIREMENTS

The quikLoader plugs into any slot of the APPLE] [+ or //e. If used in a] [+, a slightly modified 16K memory card is required in slot 0. A disk drive is required to save data.

$179.50

DOS, INTEGER BASIC, FID, and COPYA are copyrighted programs of APPLE COMPUTER, INC. licensed to Southern California Research Group to distribute for use only in combination with quikLoader.

NOW AVAILABLE: Beagle Bros. double-take for quikLoader. More programs coming soon.

Paddle-Adapple

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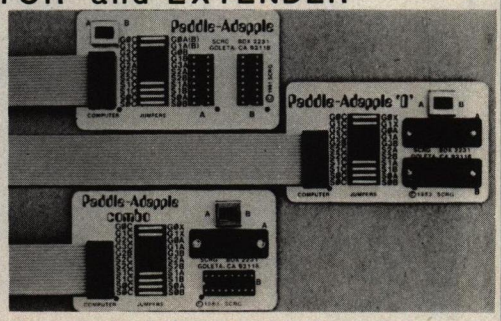

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During communication with another computer, files transmit with full error-correction and at 3 to 5 times the speed of other communications programs. The software receives and transmits any DOS 3.3 file and provides a 40K buffer from 64K RAM to record on-line conversations.

The program diskette, packaged in a vinyl-covered three-ring binder, is shrink-wrapped for shelf or counter display. The instruction manual includes step-by-step procedures for recording and saving conversations and transferring files, disk-to-disk, over phone lines. (*List Price: $79, Netmaster; $179, with Networker modem and membership to The Source database*)

Requires: Apple II, II Plus, or IIe; 48K RAM; one disk drive

Zoom Telephonics, Inc.
207 South Street
Boston, MA 02110
(617) 423-1072

CIRCLE 568 ON READER SERVICE CARD

Polymaps

Polymaps is a tool for business analysts and marketing and government planners who wish to produce maps for analysis and presentation.

The polygon editor and database manager provide file-data input. The program contains an integrated statistical package to generate cross tabs, breakdowns, descriptive statistics, frequencies, and correlations. Polymaps also includes bar, pie, line and surface charts. You can output via Apple II graphics, Houston Instruments and Hewlett-Packard plotters, or any printer that uses ASCII characters. *(List Price: $100; $185, after 1/15/84)*

Requires: Apple II, II Plus, IIe, or III in the Emulation mode; 48K RAM; one disk drive

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Box 1280
Ripley, NY 14775
(716) 736-4100

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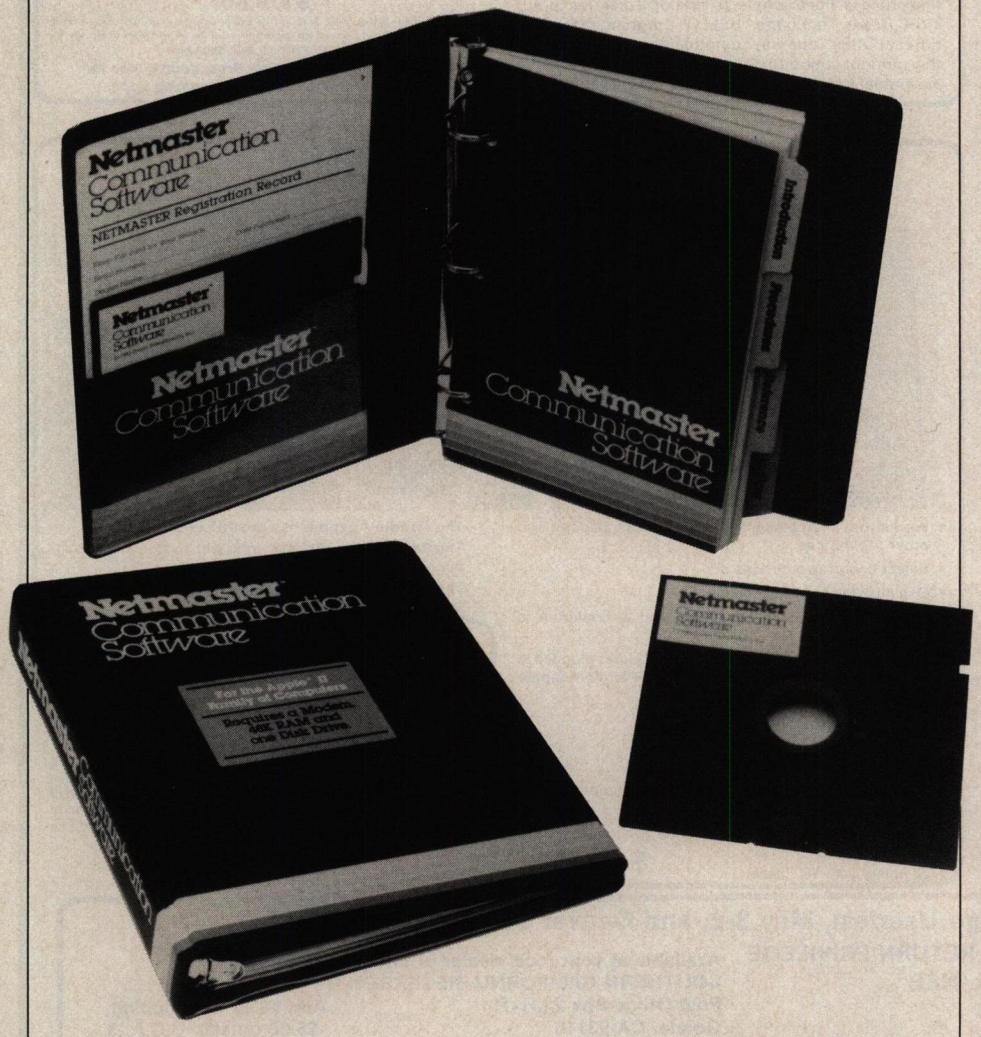

Zoom Telephonics' Netmaster Communications program

Stockpak II

Stockpak II is a fundamental-analysis software system that is available on diskettes and designed for an Apple II computer.

The system enables investors with personal computers to access information about thousands of corporations, construct graphs to compare groups of companies, and create screens based on their own criteria.

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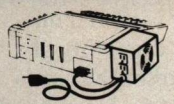

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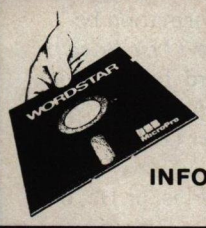

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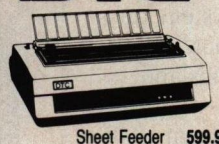

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4. Over-the-Counter—some 2200 companies on two diskettes.

Information in the service is drawn from the databases and work of analysts at Standard & Poor's Corporation. *(List Price: $245 each, NYSE and ASE diskettes; $490, OTC on two diskettes)*
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(202) 248-3472

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Requires: Apple II, II Plus, or IIe; 64K RAM; Multiplan; one disk drive
EZ Ware, Inc.
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CIRCLE 579 ON READER SERVICE CARD

Homeword
Homeword word-processing software for the home computer uses icons (symbols) to guide users through the program. The icons replace the complex documentation usually associated with utility software.

Homeword users, with the help of a short, clearly written instruction booklet and an audio cassette, can file, edit, design page layouts, and print any form of copy. There is no need to memorize complicated procedures or learn lists of commands. Using the icons as a guide, any member of the family can easily write and print personal letters, lists of addresses, phone numbers, recipes, monthly budgets, homework assignments, and overtime office work, filing any pertinent information for future reference.

Screens from Homeword, Sierra On-Line's new word-processing program for home use

The initial Homeword menu displays six pictures that represent the following options: filing (a file cabinet); editing (a page of print); printing (a printer); format design (an unorganized page with an arrow pointing to an organized page); customizing (a question mark); and disk utilities (a floppy disk). Within each category represented by the original six pictures is another menu offering icons that detail the specific functions of each option.

To recall the functions of other keys on the console, users can refer to a reference card or press the Help key, which reveals the properties of certain keys and offers short cuts. An attractive feature of Homeword is its capacity to divide the screen into three sections: the upper half reveals the working text, the lower-right side provides a replica of the entire page as it will be printed, and the lower-left side pictures a chart that notes the remaining memory and disk space. *(List Price: $69.95)*

Future programs in the Homeword series will include: Homeword Speller, which contains a wordbook of more than 28,000 commonly used and misspelled words, with the capability of adding 2500 other words of the user's choice *(List Price: $39.95)*; Homeword Double, containing Homeword and Homeword Speller *(List Price: $99.95)*; Homeword Filer, a database program for home use that is integrated with Homeword and Homeword Speller and features the same icon technology and ability to exchange information between the three systems *(List Price: $69.95)*; and Homeword Triple, which contains Homeword, Homeword Speller, and Homeword Filer *(List Price: $149.95)*.
Requires: Apple II, II Plus, or IIe; 64K RAM; one disk drive
Sierra On-Line, Inc.
Sierra On-Line Building
Coarsegold, CA 93614
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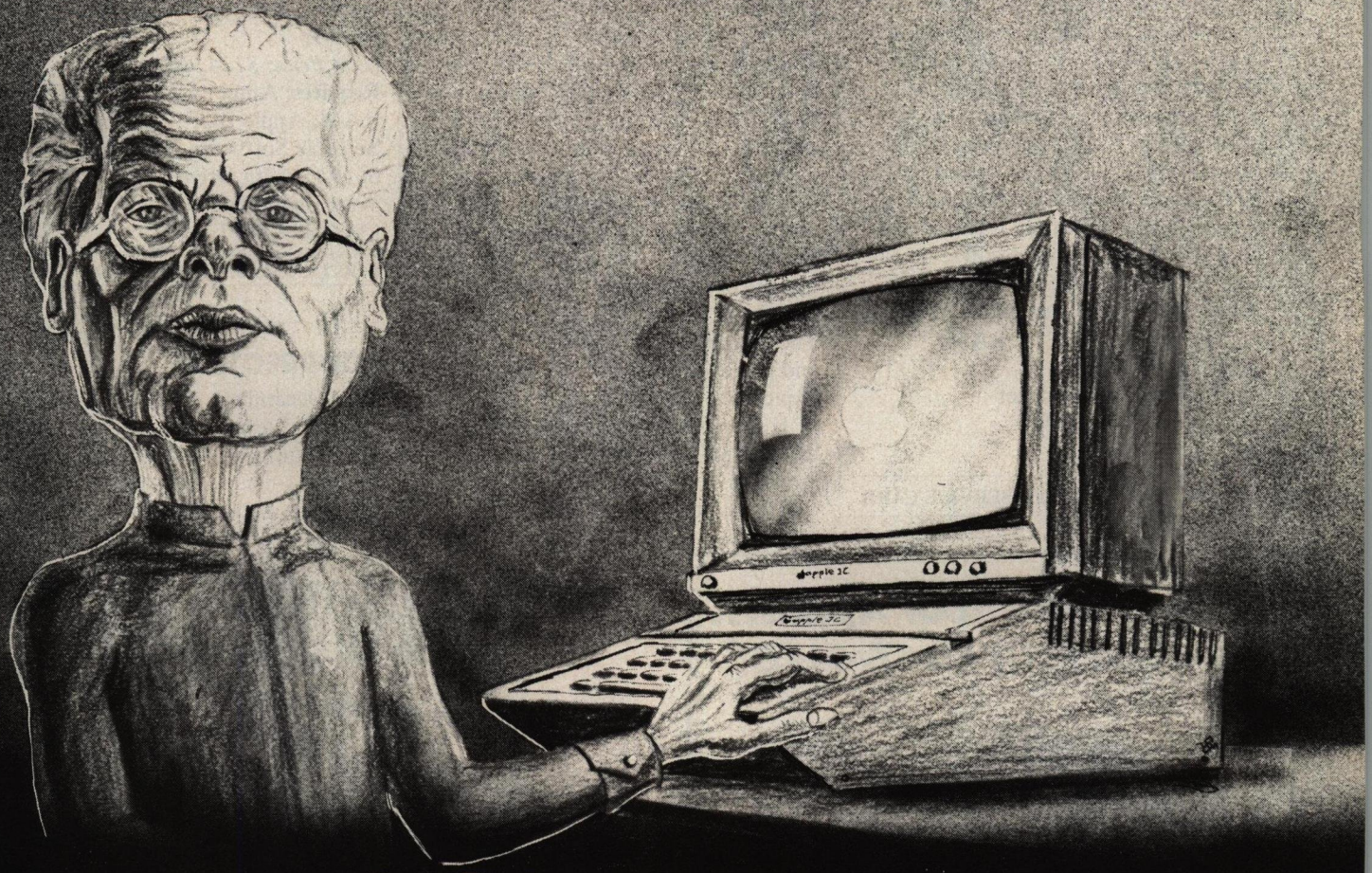
CIRCLE 580 ON READER SERVICE CARD

Finally, a 6502 Assembler that doesn't require a genius to operate.



LISA v2.6

You don't need an I.Q. of 200 to learn assembly language on your Apple II or Apple*IIe*. All you need is the best 6502 assembler around: **Lazer's Interactive Symbolic Assembler (LISA v2.6)**. LISA is the easy-to-learn and easy-to-use system that will have even the absolute beginner up and running in a matter of minutes. In addition to LISA's clearly written 240-page manual more tutorial material is available for LISA than any other assembler *(including books by D. Fudge, R. Hyde, W. Mauer, and R. Mottola)*. LISA is the beginner's best choice.

Even if your I.Q. is 200, you'll appreciate LISA's speed, power, and ease of use. At 20,000 lines/minute it's 20 to 30 times faster than ORCA/M or Apple's own Toolkit assembler. That's why people like Bill Budge, Ken Williams, Brian Fitzgerald, Don Fudge, and Steve Wozniak use it every day. LISA is very usable. That's why it's the most often used assembler ever created for the Apple II.

LISA v2.6 is available for $79.95 at computer stores everywhere. If your local computer store doesn't have a copy you can order directly from:

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PRODUCT NEWS

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Ramdrive IIe disk-emulation software works with all 64K and 128K extended 80-column cards. It allows you to use the additional memory on these cards as a RAM disk. The software is compatible with Apple Pascal 1.1, DOS 3.3, 80 columns, and double hi-res graphics. It can run up to 40 times faster than mechanical disk drives when using the supplied public-domain DOS speed-up utility. Ramdrive IIe retains the features of the Ramdisk IIe, including audio-visual access indicators, easy set-up for turnkey operation, menu-drive documentation, and reinitialize-directory ability. (*List Price: $29.95*)
Requires: Apple IIe; extended 80-column card (64K or 128K RAM)
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CORRECTION

Our December 1983 issue carried a Product News item in which Microtek's Dumpling-GX printer interface card was incorrectly priced at $159. The price is actually $89.95.

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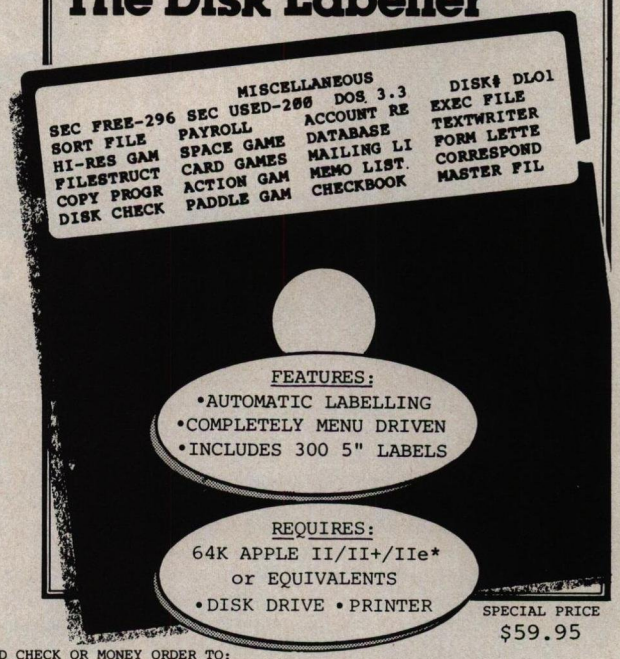

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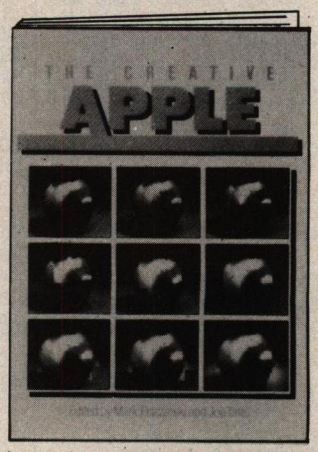

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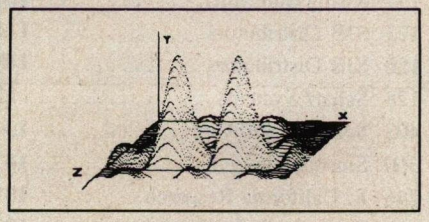

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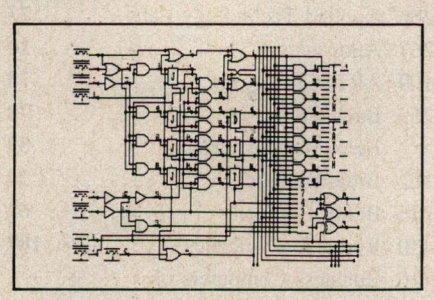

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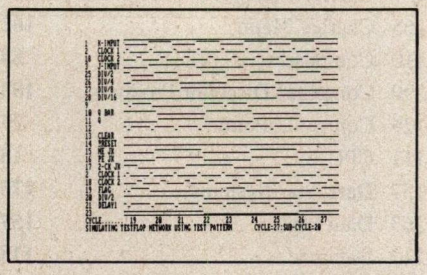

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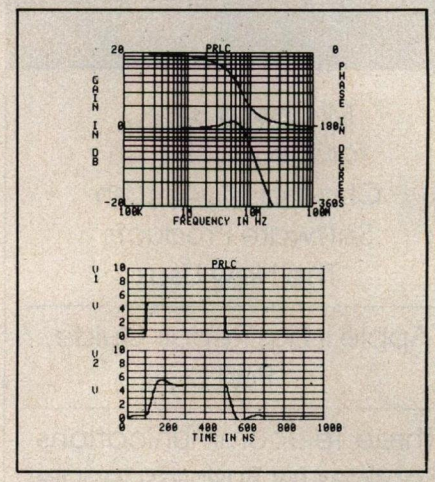

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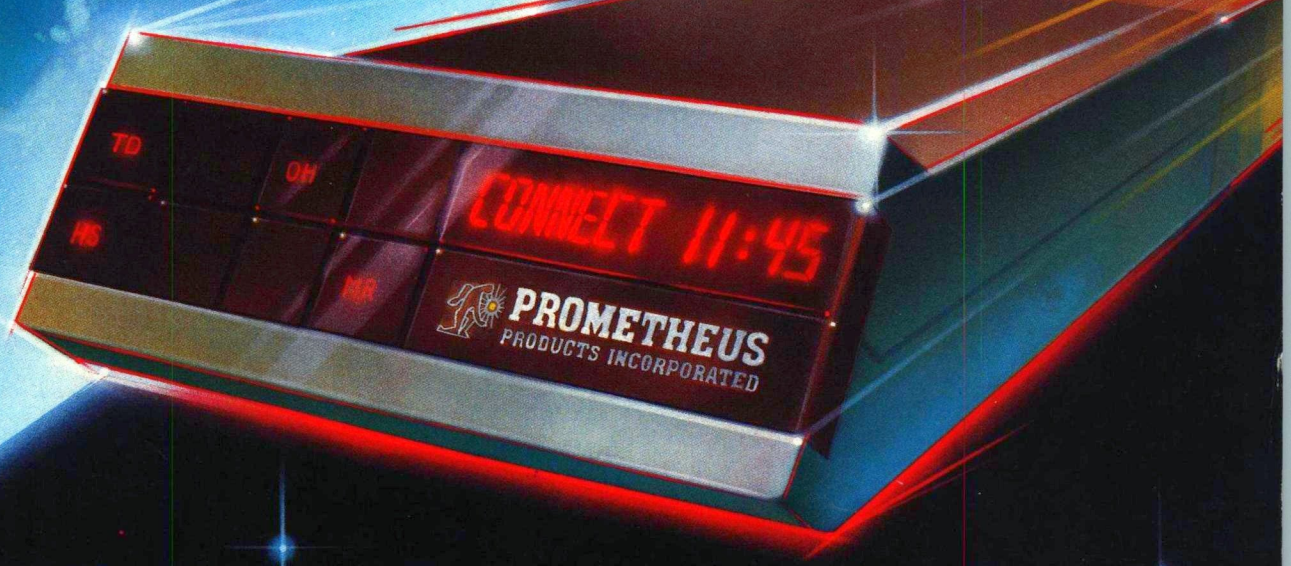

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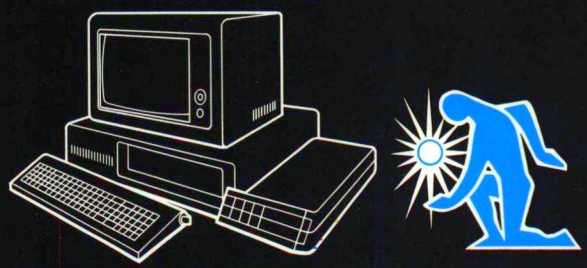

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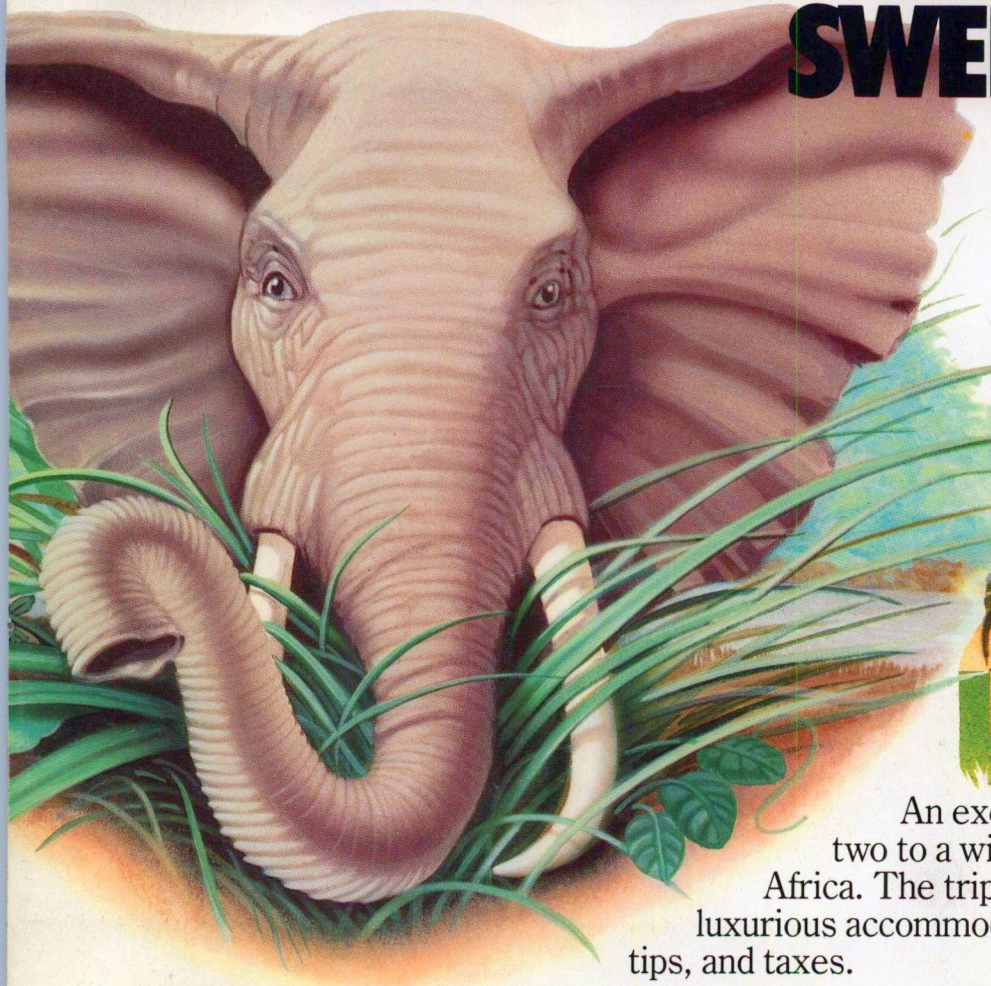

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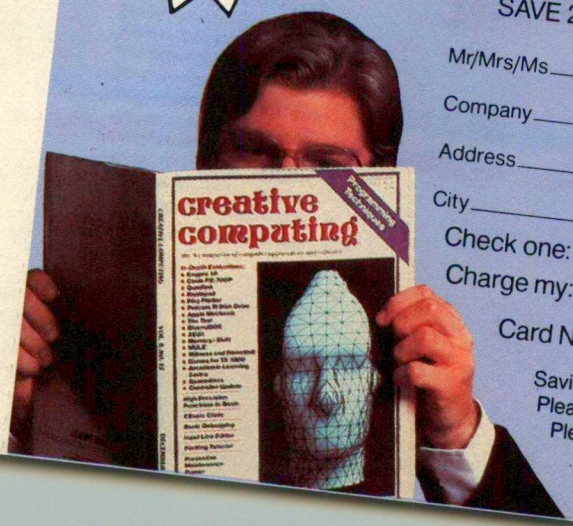

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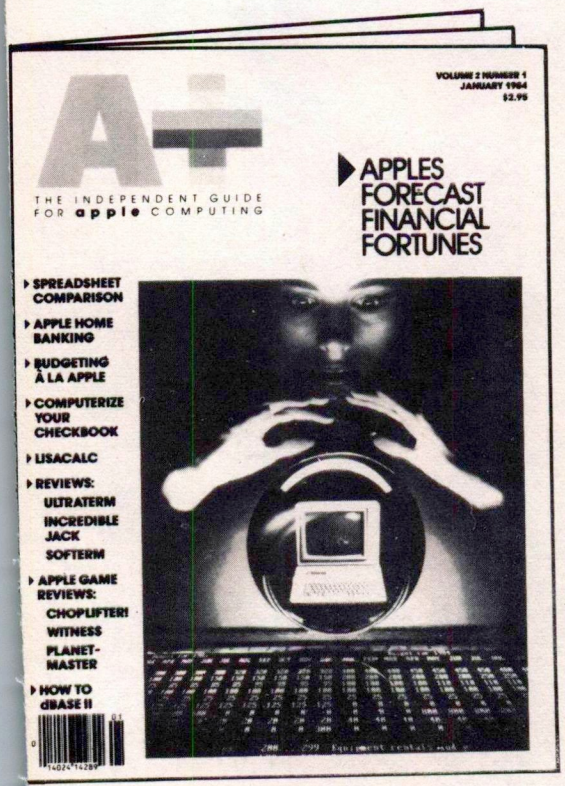

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